CONSTRUCTION PROJECT DISPUTES IN THAILAND: THE MAJOR STAKEHOLDERS' COMPARATIVE PERSPECTIVES

Surangkana Trangkanont*

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Abstract

Disputes in construction projects are inevitable because of conflicts of interest between the project stakeholders. The consequences of disputes bring about inefficient project performance and, to some extent, project failure. This research aims to identify the evolution of construction project disputes and the effective resolutions of dispute settlements in Thailand. Both qualitative and quantitative research methodologies were applied in order to achieve the study's goals. The qualitative approach of an in-depth interview (IDI) was used to understand the actual practices. The research content validity was accomplished by using the percentage of agreement among expert judgments. Then, the survey quantitative method was applied. The gathered data were analyzed through Kruskal-Wallis H and Mann-Whitney tests in order to scrutinize the different viewpoints among the major stakeholders. The results showed that there were disparate viewpoints of 4 root causes of disputes among the stakeholders. These causes consisted of "Contractors' lack of project staff and workers", "Project delay and cost overrun due to defective drawings", "Project delay due to MEP works", and "Owners' payment delay". Preferred dispute resolutions were "Negotiation" and "Conciliation". The findings will enable the stakeholders to understand, protect, and resolve the project disputes and ultimately improve Thai construction productivity.

Keywords: Construction disputes, owners, contractors, consultants

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[1] *Civil Engineering Program, Department of Civil Engineering, Faculty of Engineering, Prince of Songkla University, Songkhla, 90112 Thailand. Tel.: +66-74-287121; E-mail: tsurangkana@eng.psu.ac.th*

* *Corresponding author*

Introduction

Conflicts among construction project stakeholders are usual (Barough *et al.*, 2012) and may arise in many ways (Anderson and Polkinghorn, 2002) because all the stakeholders demand incompatible needs and expectations of the project (Olander, 2007; Cakmak and Cakmak, 2014). These conflicting interests of the stakeholders make disputes become inevitable (Chaphalkar and Sandbhor, 2015). Disputes have an effect at both the project and organizational levels. In the case of the project level, a dispute impacts on delay in construction progress, overshoot of project costs, poor work quality, inefficient safety systems, and inconvenience to the public (Anderson and Polkinghorn, 2002; Chaphalkar and Sandbhor, 2015). With regard to the organizational level, a dispute brings about an adversarial business relationship (Jannadia *et al*., 2000) and damages the reputation of both parties (Cheng *et al*., 2009). As a result, those stakeholders negotiate with one another in small and uncomplicated disputes. They may possibly face lengthy litigation processes when the disputes are larger and more complex (Jannadia *et al*., 2000).

The Thai construction industry is now challenged to understand the evolution of factors causing disputes and to identify the effective dispute resolution methods. According to the Thai Supreme Court, it was found that only 223 cases were settled through litigation during 2005-2014, as shown in Figure 1. Default in payment, breach of agreements, and project delay are the main root causes of Thai construction disputes. Approximately 8 years were, moreover, spent on resolving those decided cases. Among those cases, the actual and expected damage costs of 81 cases were approximately 1,000,000 baht with no consideration of both the direct and indirect litigation and transaction costs.

This research, thus, aimed to identify the root causes of disputes and dispute remedies that prevail in the Thai construction industry from the major project stakeholders' comparative viewpoints. These project stakeholders were project owners, contractors, and consultants. They directly supervise, inspect, and manage a construction project. Therefore, they know the multidimensional root causes of disputes in the construction projects and appropriate ways to resolve them. The expected results of this study should enhance the productivity of the Thai construction industry.

Literature Review

Construction Disputes

Disputes are one of the significant factors causing construction project inefficiency (Chaphalkar and Patil, 2012; Cakmak and Cakmak, 2014). Disagreements resulting in

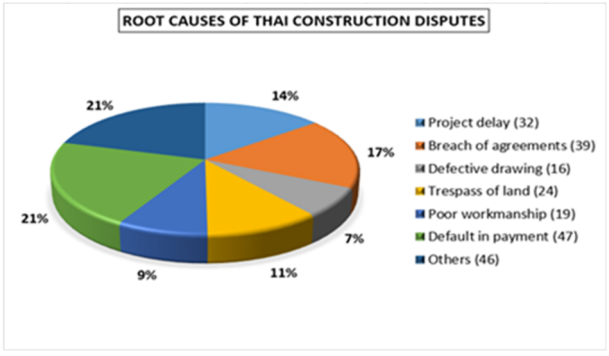

Figure 1. Root causes of disputes in Thai construction industry

disputes are hard to interpret and are influenced by many interrelated factors (Chaphalkar and Sandbhor, 2015). Several researchers have attempted to investigate the evolution of construction disputes. Some factors can be seen in Table 1.

Cheng *et al.* (2009) described 39 root causes of construction disputes in the Republic of China and grouped them into 4 groups, namely "caused by owners", "caused by general contractors", "caused by both parties", and "caused by acts of God", Cakmak and Cakmak

Table 1. The summarization of dispute root causes

Cheng *et al*. (2009)	Cakmak and Cakmak (2014)	Chaphalkar and Patil (2012)	Yusuwan and Adnan (2013)
1. Caused by owners	**1. Owner related**	**1. Change in design, drawings, and specifications**	**1. Common disputed issues associated with EoT**
1.1 Unclear tender document	1.1 Variations initiated by the owner		
1.2 Unclear blueprints	1.2 Change of scope	1.1 Change in design during execution	1.1 Concurrent delay
1.3 Tender qualification	1.3 Acceleration	1.2 Change in drawing during execution	1.2 Eligibility of time extension claim
1.4 Tender decision process	1.4 Unrealistic expectations	1.3 Change in specifications during execution	1.3 Failure by the contractor to comply with contractual requirement for EOT application
1.5 Land not available on schedule	1.5 Payment delays		
1.6 Inspection delayed	**2. Contractor related**	**2. Change in quantity of items during execution**	1.4 Inadequate effort in mitigation of the delay
1.7 Co-operation delayed	2.1 Delays in work progress		
1.8 Pipeline re-located	2.2 Time extensions	2.1 Change in quantity of items during execution	1.5 Poor demonstration of the impact of the delay event to the project schedule
1.9 Contract terminated unilaterally	2.3 Finance failure of the contractor		
1.10 Site ambit changed	2.4 Technical inadequacy of the contractor	**3. Change in scope of work**	1.6 Permissible period of time extension
1.11 Advance use		3.1 Change necessitated due to change in scope of work	
1.12 Payment disputes	2.5 Tendering		1.7 Conflicting interpretation of contractual provision
1.13 Payment delayed	2.6 Quality of works	**4. Unforeseen circumstances**	
1.14 Doubts about related laws	**3. Design related**	4.1 Contractor's perception	1.8 The absence of notice of delay by the contractor as required
1.15 Contract time disputes	3.1 Design error	4.2 Unforeseen circumstances	
1.16 Construction acceleration	3.2 Inadequate / incomplete specification	4.3 Additional difficulties in executing the work	1.9 The choice of method for evaluating the delay
1.17 Quality identification			
1.18 Inspection disputes	3.3 Quality of design	4.4 Uncontemplated items at the time of	

(2014) summed up the dispute root causes concluded by various researchers from numerous countries and categorized them into 7 groups based on the related contractual parties, construction documents, human behavior,

Table 1. The summarization of dispute root causes (continue)

Cheng *et al*. (2009)	Cakmak and Cakmak (2014)	Chaphalkar and Patil (2012)	Yusuwan and Adnan (2013)
1.19 Unreasonable limitations	3.4 Availability of information	tendering	1.10 Global claim
1.20 Unclear contract content	**4. Contract related**	4.5 Requirement of law	1.11 Conflicts on the ownership of float
2. Caused by general contractors	4.1 Ambiguities in contract documents	4.6 Contract based on approximate estimate	
2.1 Unsuitable illustration			
2.2 Down tick tender	4.2 Different interpretations of the contract provision	4.7 Instructions by other government authorities	
2.3 Collusive tender			
2.4 Delayed contract time	4.3 Risk allocation	4.8 Failure of existing works	
2.5 Tender decision process	4.4 Other contract problems	4.9 Reworks due to noncompliance with the original work	
3. Caused by both parties	**5. Human behavior related**		
3.1 Related laws	5.1 Adversarial / controversial culture	4.10 Poor workmanship of the contract	
3.2 Default on contract	5.2 Lack of communication	etc.	
3.3 Payment disputes	5.3 Lack of team spirit		
3.4 Contract time delayed	**6. Project related**		
3.5 Compensation responsibility	6.1 Site conditions		
3.6 Unclear tender documentation	6.2 Unforeseen changes		
4. Caused by acts of God	**7. External factors**		
4.1 Tender decision process	7.1 Weather		
4.2 Quality identification	7.2 Legal and economic factors		
4.3 Related laws	7.3 Fragmented structure of the sector		
4.4 Severe weather			
4.5 Unanticipated site condition			
4.6 Unanticipated human factors			
4.7 Rising cost index			
4.8 Policy changed			

project site conditions, and external factors such as weather, legal, and economic factors.

Due to the refusal of construction claims leading to disputes, Chaphalkar and Patil (2012) and Chaphalkar and Sandbhor (2015) identified 15 causes of construction disputes derived from variation and deviation claims. These disputes were collected through their study on arbitration awards in India. These causes of disputes were classified and labeled as "change in design, drawings, and specifications", "change in quantity of items during execution", "change in scope of work", and "unforeseen circumstances". Yusuwan and Adnan (2013) also presented 11 common disputed matters related to extension of time (EoT) in Malaysia.

The undesirable outcomes of these disputes lead to project delays, cost overruns, poor work quality and safety systems, and inconvenience to the public (Anderson and Polkinghorn, 2002; Chaphalkar and Sandbhor, 2015), confrontational business relationships (Jannadia *et al.*, 2000), and ruined reputations of both parties (Cheng *et al.*, 2009). However, disputes can be best settled once the relevant information is perceived (du Preez, 2014). Therefore, the construction industry continues to establish various methods in order to fairly and economically resolve disputes (Cheng *et al.*, 2009).

Construction Dispute Settlement Methods

Several scholars have put forward their attempts to determine the approaches to construction dispute prevention and resolution (Zaneldin, 2006). These attempts aimed to achieve several principal outcomes, namely equitability, speed, cost effectiveness, expertise, confidentiality and private consensus, continuity, control, and practicality (Jannadia *et al.*, 2000; Ng *et al.*, 2007; Cheng *et al.*, 2009; du Preez, 2014). Well- known common practices for construction project stakeholders, when disputes incur, are to negotiate in cases of minor and uncomplicated issues and to litigate in cases of greater and more multifaceted issues (Jannadia *et al.*, 2000).

Cheung (1999) and Ng *et al.* (2007) proposed construction dispute resolution steps consisting of negotiation, standing neutral, non-binding resolution, and binding resolution and/ or litigation. Kassab *et al.* (2006) mentioned an alternate dispute resolution (ADR) and applied ADR to develop a decision support system. du Preez (2014) studied ADR but emphasized only its conciliation method. Jannadia *et al.* (2000) indicated that, during the contractual stage, the contract administration methods of a neutral arbitrator provision and binding arbitration should be applied in order to resolve construction disputes. Cheng *et al.* (2009) employed dispute settlement methods comprising reconciliation, mediation, pleading, arbitration, and litigation, to develop a dispute settlement assistance system. According to these researchers' studies, all their dispute remedy approaches were intensively scrutinized and their principles were explained according to dispute resolution steps (Cheung, 1999; Jannadia *et al.*, 2000) as follows:

Negotiation is a process in which parties aim to resolve their mutual misunderstanding quickly through meetings and open discussion (Ng *et al.*, 2007; Bakhary *et al.*, 2015). In negotiation, the disputants are free to form, proceed, and set the type of the agreement (Cheung, 1999).

Standing neutral or conciliation relates to empowering a neutral third party to regularly visit the project site, observe project activities, meet with key project staff, attend project meetings, be informed of project progress, find the facts, and resolve disagreements throughout the construction process when they arise (Jannadia *et al.*, 2000; Ng *et al.*, 2007; Chaphalkar and Sandbhor, 2015). This party can be an individual or panel (Ng *et al.*, 2007; Chaphalkar and Sandbhor, 2015) and has to be admired and compensated by the contractual parties (Jannadia *et al.*, 2000). The problems are noted and the facts are clear. This method is uncostly (Kassab *et al.*, 2006). Timely provision of his/her/their professional knowledge prevents an adversarial relationship (Ng *et al.*, 2007), improves communications, and creates trust and a cooperative atmosphere (Chaphalkar and Sandbhor, 2015). However, if the neutral's recommendations are challenged by either disputant, the recommendations can be produced as evidence in court (Jannadia *et al.*, 2000).

Non-binding resolution, mediation, mini-trial, or adjudication involve a mutually agreeable solution with the aid of an impartial facilitator in achieving a settlement (Ng *et al.*, 2007). The difference between a standing neutral and a non-binding resolution is that, at this stage, the problem has fully developed into a dispute (Cheung, 1999). The mediation need not be conducted by an expert (du Preez, 2014). The contractual parties can volunteer procedures and choose the third party by mutual agreement (Ng *et al*., 2007). The role of a facilitator/mediator is expected to provide a non-binding solution and to be consultative (Ng *et al*., 2007; Chaphalkar and Sandbhor, 2015). A mediation agreement should be recorded and signed by both disputants (du Preez, 2014).

Binding resolution or arbitration is defined as "referral of a dispute to one or more impartial persons for final and binding determination. Private and confidential, it is a designed for quick, practical, and economical settlement" (Ng *et al*., 2007). These persons are knowledgeable, experienced, and professionals in the construction industry (Jannadia *et al*., 2000). The arbitration method is a giant step involving formal identification of opposing positions and issues; therefore, considerable preparation is needed by the parties with the assistance of lawyers, consultants, and expert witness before a private judgment (Cheung, 1999).

Litigation is the last resolution step in disputes and no one wants to be involved at this point because it results in a win-lose situation and has the effect of an adversarial business relationship (Jannadia *et al*., 2000; Ng *et al.*, 2007). It is subject to the regulations and practices set out by the court. Thus, the outcome will be imposed by a third party (Cheung, 1999). However, it possibly improves the situation through a rigid discovery procedure and persuasive presentation (Ng *et al*., 2007).

Alternative Dispute Resolution Practice in Thailand

Thai ADR has also been investigated and is shown in Figure 2. According to the Thailand Arbitration Center website (2016), when disagreements occur, the contractual parties jump to negotiation in order to solve the problems. All evidence such as contract clauses, drawings, and specifications are used as work references.

When the negotiations fail, conciliation is applied. The disputants may choose to invite a neutral person who is knowledgeable, professional, and has a particular expertise in such a field from the Engineering Institute of Thailand or from an academic institute to provide the recommendations. These recommendations do not bind but are recorded and signed by both parties.

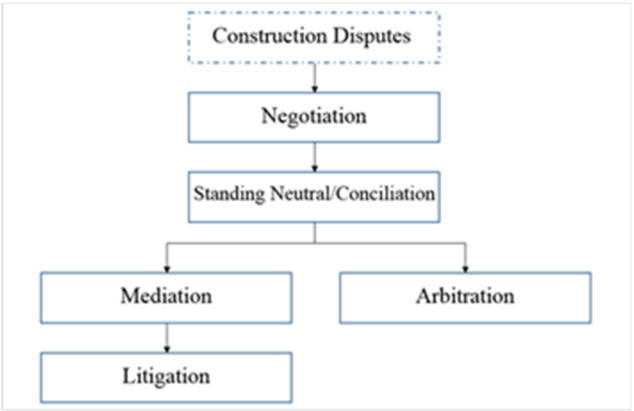

Figure 2. Common practice of ADR in Thai construction disputes

Once the disagreement extends to a dispute, mediation is needed. In court, Thai construction dispute procedures are under the civil and commercial code. When one disputant sues another, the mediator who is a judge or who is authorized by a judge, is appointed to solve the problems. The mediator is impartial and puts forward his/her attempts to achieve settlement of the dispute. If the dispute is not settled, the litigation is carried on.

Arbitration can be specified in the contract. The formal identification of partly or fully disputed issues will have been done in the preparation of the contract documents. However, if the contractual documents are prepared with no regard to the dispute resolution clause, both parties can settle disputes by voluntarily inviting a neutral party or arbitrator, a person or a panel, to provide hi/her/their judgment according to the project investigation. In this case, the dispute settlements are not binding. Therefore, the effectiveness of arbitration relies on contractual clauses.

The last sort of dispute settlement method is litigation. This method is lengthy and costly because of the fixed systematized process. This process is set up by the court under the civil and commercial code. Moreover, both dispute parties have lost control because the dispute resolution procedures and outcomes depend on the third party's abilities.

Method

To achieve the study' s objectives of identifying Thai construction disputes and preferred resolutions, the study started by intensively reviewing literature related to disputes, conflicts, claims, and dispute resolutions in the construction industry. Then, the root causes of Thai construction disputes were investigated through examination of the Thai Supreme Court. Next, a semi-structured interview was developed in order to apply an in-depth interview (IDI). The rationale of the application of an IDI is that abundant information gained from the IDI approach is given by key informants (Boyce and Neale, 2006).

After that, the IDI protocol was created in order to achieve research reliability (Boyce and Neale, 2006). Simultaneously, 4 project contractors and 4 project owners were invited to provide their experiences and perception of disputes and dispute resolutions. All of them have more than 10 years' experience in the industry. Each interviewee was questioned until the collected data were complete.

Next, the data gathered from the IDI method, the Thai Supreme Court, and the literature were investigated in order to ensure that there was no repetition of the dispute root causes and dispute resolutions. As a result, 36 causes and 5 dispute remedies were listed. Later, 16 professionals consisting of 4 owners, 4 contractors, 4 academicians, and 4 consultants were invited to validate the content of those causes and resolutions. All of them have worked in the industry for at least 10 years and were not in the same group as the IDI panel.

These professionals were asked to do content validity by rating only -1, 0, or 1 for each item in the lists. A rating of -1 means "I have never faced this issue", 0 means "I have faced this issue, but it did not have an effect", and 1 means "I have faced this issue and it had an impact". This principle of content validation is basically applied in order to calculate the agreement percentage among expert judgment because it does not account for the contribution of coincidental arrangement. These percentages presented the level of significance of each item based on the professionals' perspectives (Thorn and Deitz, 1989). Once the agreement percentage of each item was computed, only the agreement percentages of the lists ranging from 50% upwards were chosen for developing the research questionnaire. As a result, only 11 dispute root causes and 5 dispute resolutions were used to develop the questionnaire.

Then, the survey approach, using the questionnaire as a tool for collecting the research data, was implemented. The selection of respondents was random. Only 600 organizations were randomly chosen due to time and budget limitations. These organizations comprised consultants, contractors, and project owner firms. The list of consultant companies was gained from the Council of Engineers'

website. The list of the owner organizations was gathered from the website of the Thai Real Estate Association and the Stock Exchange of Thailand. This included public institutions. The list of contractor firms was found through the Thai Contractor's website.

Each questionnaire consisted of 4 sections as follows:

- The questions in the first part related to the respondents' profiles such as age, position, education, workplace, types of project, and so on.
- The questions in the second part related to the frequency of validated dispute root cause occurrences and their impacts on project costs. The respondents were requested to rate against a 5-point Likert scale for frequency as follows: 1 = never happens, 2 = rarely, 3 = sometimes, 4 = often, and 5 = usually. For the impacts of the dispute root causes on the project costs, the respondents were asked to rate against a 5-point Likert scale represented as follows: 1 = having an impact on the project value less than 5%, 2 = having an impact on the project value between 5-10%, 3 = having an impact on the project value between 10-15%, 4 = having an impact on the project value between 15-25%, and 5 = having an impact on the project value more than 25%.
- The third part related to the questions of the preferred construction dispute resolutions based on validated dispute root causes.
- The final part was open-ended questions asking the respondents to share their opinions, best practice experiences, and knowledge in order to prevent, minimize, and resolve disputes.

After that, the questionnaires were subjected to peer evaluation and then tested in terms of internal consistency or reliability by using Cronbach's alpha (α) function of the Statistical Package for the Social Sciences (SPSS) version 17.00. The result showed that the α values were 0.908. Thus, the questionnaire was satisfactory owing to an α value above 0.7 (Vale *et al*., 1997).

The SPSS was also used to analyze the raw data by firstly examining the data normality. This examination is important because the result of the examination implies the appropriate statistical analysis methods (Razali and Wah, 2011). In this study, the Shapiro-Wilk (SW) test was used because the SW test is the best test for symmetric non-normal distributions (Razali and Wah, 2011). According to the SW test, the result indicated that the data were non-normal distributions when the confidence interval for the mean was 95%. Unsurprisingly, since the data were measured by the rating of a

Table 2. Respondents' biographies

	Owner		Consultant		Contractor		Total	
	Number	%	Number	%	Number	%	Number	%
Construction experiences								
Less than 10 years	0	0%	0	0%	31	45%	31	22%
11-20 years	17	41%	6	21%	14	20%	37	27%
21-30 years	15	37%	8	28%	14	20%	37	27%
30 years upwards	9	22%	15	52%	10	14%	34	24%
Total	41	100%	29	100%	69	100%	139	100%
Positions								
Engineer	9	25%	3	11%	30	45%	42	32%
Project Manager	7	19%	9	32%	13	19%	29	22%
Project Director	3	8%	8	29%	2	3%	13	10%
Supporting Project Manager	0	0%	0	0%	2	3%	2	2%
Managing Director	3	8%	5	18%	10	15%	18	14%
Supervisor	0	0%	0	0%	1	1%	1	1%
Head of Construction Supervision	3	8%	0	0%	0	0%	3	2%
Procurement committee	5	14%	0	0%	0	0%	5	4%
Others	6	17%	3	11%	9	13%	18	14%
Total	36	100%	28	100%	67	100%	131	100%

5-point Likert scale, it was considered ordinal in nature, as mentioned by Yusuwan and Adnan (2013).

Owing to non-normality, the comparison of the major stakeholders' perspectives on each issue was analyzed by using the non-parametric statistical methods of the Kruskal-Wallis H test (KWt). This test is the preferred procedure in the case of comparing more than 2 independent samples (Vargha and Delaney, 1998). According to the KWt, a null and alternative hypothesis, at a significance level (α) of 0.05, was as follows:

H01 = the viewpoint of stakeholder groups in the frequency and impacts in each dispute was identical

HA1 = the viewpoint of stakeholder groups in the frequency and impacts in each dispute was not identical

If there are different stakeholders' viewpoints among the frequency and impacts in any dispute root causes according to the KWt, the frequency and impacts of such disputes are tested again by using the Mann-Whitney U (MWU) test. The application of the MWU test aimed particularly to identify 2 stakeholders who had different viewpoints on such an issue. According to the MWU test, a null and alternative hypothesis, at a significance level (α) of 0.05, was as follows:

H02 = the viewpoint of a certain pair of stakeholder groups in the frequency and impacts in each dispute was identical

HA2 = the viewpoint of a certain pair of stakeholder groups in the frequency and impacts in each dispute was not identical

Finally, the preferred dispute resolutions were examined by counting the frequency.

Results

Based on the survey approach, 139 questionnaires were replied to and were available. The biographies of the respondents in terms of experience and position are shown in Table 2. Most respondents' experience was more than 10 years. Although a few respondents (8 people) declined or overlooked to fill in their positions, a large number of them (131 people) did so. Most of the respondents were engineers, project managers, project directors, and managing directors who directly managed, inspected, and supervised their projects. Therefore, the gathered data were trustworthy to achieve the research's purposes.

The mean scores of each significant issue are shown in Table 3. All major stakeholders agreed that the most critical root cause of dispute in terms of frequency and impact was "Contractors' lack of project staff and workers'. Regarding the frequency, it was found that "Project delay due to delay in work progress", "Disparity of quality acceptance", "Construction materials and equipment delivery delay", and "Project delay due to mechanical, electrical, and plumbing (MEP) works" were also in the top five causes. Considering the impact, the results showed that the rankings of "Project delay due to delay in work progress", "Project delay and cost overrun due to defective drawing", "Disparity of quality acceptance", and "Project delay due to MEP works" were high. According to these outcomes, the frequency of dispute occurrences and their impact were almost equal.

The application of the KWt aimed to test the hypothesis of H01 and HA1 or to identify the stakeholders' comparative viewpoints. The results showed that there was a statistically significant difference in some particular dispute root cause frequency/impacts among the stakeholders. Only the dispute root cause frequency/impacts for which their Asymptotic Significance (Asymp. Sig.) values were less than the significance level at 0.05 were selected and explained. This is because such Asymp. Sig. values implied there were at least 2 stakeholder groups that had different viewpoints. In other words, the alternative hypothesis (HA1 of the "viewpoint of stakeholder groups on the frequency and impacts of each dispute was not identical" was accepted. These Asymp. Sig. values coupled with their frequency/ impacts mean rank score are presented in Table 4.

Regarding the frequency, there were at least 2 stakeholder groups that had a statistically significant difference in their viewpoints of the dispute root cause of

Table 3. Mean score of frequency and impact of dispute root causes

Root causes of Dispute	Frequency								Impact							
	Owners		Consultants		Contractors		Overall		Owners		Consultants		Contractors		Overall	
	Mean score	Ranking	Mean score	Ranking	Mean score	Ranking	Mean score	Ranking	Mean score	Ranking	Mean score	Ranking	Mean score	Ranking	Mean score	Ranking
Contractors' lack of project staff and workers	3.78	1	3.22	1	3.06	1	3.31	1	3.46	1	2.67	1	2.66	3	2.90	1
Time extension due to weather	2.59	6	2.62	6	2.69	6	2.64	6	2.14	6	1.92	10	2.33	10	2.19	10
Disparity of quality acceptance	2.88	3	2.93	3	2.81	2	2.85	3	2.50	3	2.04	8	2.46	6	2.39	4
Project delay due to delay in work progress	3.00	2	3.11	2	2.76	5	2.91	2	2.58	2	2.08	7	2.61	5	2.49	2
Construction materials and equipment delivery delay	2.63	5	2.86	4	2.63	7	2.68	4	2.44	4	2.24	2	2.29	11	2.33	6
Disparity of contractual interpretation	2.17	8	2.15	11	2.45	8	2.31	9	1.91	10	1.96	9	2.36	8	2.14	11
Project delay and cost overrun due to defective drawing	2.15	9	2.38	8	2.79	3	2.52	7	1.94	9	2.17	3	2.83	1	2.43	3
Insufficient project quality supervisors	2.65	4	2.42	7	2.25	11	2.41	8	2.36	5	2.17	3	2.35	9	2.32	7
Project delay due to MEP works	2.48	7	2.68	5	2.78	4	2.67	5	2.03	8	2.16	6	2.67	2	2.37	5
Project delay due to subcontractors' work abandon	2.13	10	2.32	9	2.33	10	2.27	10	2.06	7	1.91	11	2.43	7	2.22	9
Owners' payment delay	1.78	11	2.32	9	2.45	8	2.22	11	1.71	11	2.17	3	2.63	4	2.26	8

Table 4. The comparison of major stakeholders' perspective on root causes of disputes

Root causes of disputes	Kruskal-Wallis H test				Mann-Whitney test								
	Owners (Mean Rank)	Consultants (Mean Rank)	Contractors (Mean Rank)	Asymp. Sig.	Owners (Mean Rank)	Consultants (Mean Rank)	Asymp. Sig.	Owners (Mean Rank)	Contractors (Mean Rank)	Asymp. Sig.	Consultants (Mean Rank)	Contractors (Mean Rank)	Asymp. Sig.
Frequency													
Contractors. lack of project staff and workers	84.54	64.76	58.04	0.002	38.48	28.46	0.033	67.06	45.89	0.000			
Project delay and cost overrun due to defective drawing	53.38	64.00	76.30	0.005				42.75	60.72	0.002			
Owners' payment delay	51.35	70.98	75.81	0.003	30.25	40.57	0.021	41.60	60.71	0.001			
Impact													
Contractors' lack of project staff and workers	76.09	55.71	56.02	0.013	35.03	24.79	0.024	60.07	43.99	0.006			
Project delay and cost overrun due to defective drawing	44.79	53.56	69.83	0.001				34.96	54.27	0.001	32.90	45.06	0.030
Project delay due to MEP works	51.04	54.42	67.97	0.037				39.24	52.63	0.017			
Owners' payment delay	43.91	54.88	67.72	0.002				34.13	53.08	0.001			

"Contractors' lack of project staff and workers", "Project delay and cost overrun due to defective drawing", and "Owners' payment delay". This is because the Asymp. Sig. values of these root causes were 0.002, 0.005, and 0.003, respectively. Compared to the significance level (α) of 0.05, these Asymp. Sig. values were less than the α value. The alternative hypothesis (HA1) of the "viewpoints of stakeholder groups on the frequency of "Contractors' lack of project staff and workers". "Project delay and cost overrun due to defective drawing", and "Owners' payment delay", were not identical" was, therefore, accepted.

With regard to the impacts, there were at least 2 stakeholder groups that had a statistically significant difference in the dispute root causes opinions of "Contractors' lack of project staff and workers", "Project delay and cost overrun due to defective drawing", "Project delay due to MEP works", and "Owners' payment delay". The Asymp. Sig. values of these root causes were 0.013, 0.001, 0.037, and 0.002, respectively. According to the α value of 0.05, the alternative hypothesis (HA1) of the "viewpoints of stakeholder groups on the impacts of "Contractors' lack of project staff and workers", "Project delay and cost overrun due to defective drawing", "Project delay due to MEP works", and "Owners' payment delay", were not identical" was, thus, accepted.

The results of the KWt only indicated that there are at least 2 groups having a statistically significant difference in the opinion of the considered issue, but the results could not identify which groups have different opinions. To examine which parties have a statistically significant difference on the attitude of these dispute root causes frequency/impacts, the (MWU) test was employed according to the results of the KWt. The frequency/impacts of dispute root causes that had their Asymp. Sig. values less than the significance level at 0.05 were chosen and described, since they implied a selected pair of stakeholder groups had different viewpoints. In other words, the alternative hypothesis (HA2) of the "viewpoint of a certain pair of stakeholder groups on the frequency/ impacts in each dispute was not identical" was accepted. These Asymp. Sig. values and mean rank frequency/ impacts scores, gained from the MWU test, are also shown in Table 4.

The opinions of project owners and consultants were firstly compared to each other. The results of the comparison showed that in the case of the dispute root cause frequency/impacts of "Contractors' lack of project staff and workers", owners and consultants have a significantly different perspective on the frequency of this dispute root cause with an Asymp. Sig. value of 0.033 and a mean rank frequency score of 38.48 for owners and 28.46 for consultants. Regarding the impacts of "Contractors' lack of project staff and workers", owners and consultants have also a significantly different point of view on this issue with an Asymp. Sig. value of 0.024 and a mean rank impact score of 35.03 for owners and 24.79 for consultants. These results implied that the owners and consultants have a disparate perspective on this dispute root cause frequency/ impacts according to the comparison between the Asymp. Sig. value and α value. The mean rank value implied that the owners considered this issue frequently occurred and had a huge impact on the projects, whereas the consultants did not.

In addition, the result of the MWU test indicated that both parties have a significantly different opinion on the frequency of "Owners' payment delay" as well. The Asymp. Sig. value was 0.021 with a mean rank frequency score on this issue of 30.25 for owners and 40.57 for consultants. According to these outcomes, the owners and consultants have a disparate perspective on the frequency of "Owners' payment delay" as a dispute root cause. The mean rank value implied that the consultants regularly viewed the owners' as withholding payment, whereas the owners did not totally agree.

Next, the opinions of contractors and owners on the frequency/impacts of the dispute root causes, gained from the KWt, were also compared to each other. The results were not surprising. All Asymp. Sig. values were less than the significance level at 0.05. These parties all have significantly different viewpoints on the frequency/impacts of the dispute root

causes. The mean rank frequency score of the "Contractors' lack of project staff and workers" root cause was 67.06 for owners and 45.89 for contractors. The mean rank impact score of the "Contractors' lack of project staff and workers" root cause was 60.07 for owners and 43.99 for contractors. This means that the owners recognized this root cause as the major cause of dispute, whereas the contractors did not quite agree.

The mean rank frequency/impact scores of the "Project delay and cost overrun due to defective drawing" root cause were 42.75/34.96 for owners and 60.72/54.27 for contractors. The mean rank frequency/impact scores of the "Owners' payment delay" root cause were 41.60/34.13 for owners and 60.71/53.08 for contractors. These mean rank scores implied that the contractors perceived this root cause often incurred and has an effect on their project costs. Regarding the mean rank impact score of the "Project delay due to MEP works" root cause, it was 39.24 for owners and 52.63 for contractors. This outcome indicated that the contractors feel more pain with the impacts of this dispute root cause than the owners.

Lastly, the contractors' and consultants' points of view on the frequency/impacts of the dispute root causes were statistically compared to each other. The result indicated that only the dispute root cause impacts of "Project delay and cost overrun due to defective drawing" were significantly differently viewed because the Asymp. Sig. value was 0.030. The mean rank impact score was 32.90 for consultants and 45.06 for contractors. The result suggested that the consultants did not consider that the impacts of defective drawings have as huge an effect on the project cost as the contractors considered.

Finally, the frequency of each preferred dispute resolution according to certain dispute root causes was reported, as shown in Table 5. Only the "Disparity of contractual interpretation" root cause of disputes was preferred to be resolved by using "Conciliation". The number of stakeholders preferring this resolution was 22 people (or 55%) for the owners, 10 people (or 35.71%) for the consultants, and 31 people (or 44.93%) for the contractors. The

Table 5. Stakeholders' preferred dispute solution on the root causes of disputes

Root causes of disputes	Preferred dispute solution	Owners		Consultants		Contractors		Overall	
		Number	%	Number	%	Number	%	Number	%
Contractors' lack of project staff and workers	Negotiation	29	70.73%	23	82.14%	51	73.91%	103	74.64%
Time extension due to weather	Negotiation	26	63.41%	22	78.57%	51	73.91%	99	71.73%
Disparity of quality acceptance	Negotiation	25	60.98%	12	42.86%	41	60.29%	78	56.93%
Project delay due to delay in work progress	Negotiation	26	65.00%	21	75.00%	43	62.32%	90	65.69%
Construction materials and equipment delivery delay	Negotiation	29	72.50%	21	75.00%	44	63.77%	94	68.61%
Disparity of contractual interpretation	Conciliation	22	55.00%	10	35.71%	31	44.93%	63	45.99%
Project delay and cost overrun due to defective drawing	Negotiation	18	47.37%	20	74.07%	37	55.22%	75	56.82%
Insufficient project quality supervisors	Negotiation	27	71.05%	19	70.37%	41	61.19%	87	65.91%
Project delay due to MEP works	Negotiation	26	66.67%	18	66.67%	36	53.73%	80	60.15%
Project delay due to subcontractors' work abandon	Negotiation	13	34.20%	13	48.15%	25	37.31%	51	38.64%
Owners' payment delay	Negotiation	20	54.05%	12	44.44%	28	41.79%	60	45.80%

rest of the root causes were satisfactorily resolved through "Negotiation".

The majority of each stakeholder group obviously preferred to resolve the dispute root causes of "Contractors' lack of project staff and workers", "Time extension due to weather", "Project delay due to delay in work progress", "Construction materials and equipment delivery delay", "Insufficient project quality supervisors", and "Project delay due to MEP works" by "Negotiation".

It is worth noting here that the dispute root cause of "Disparity of quality acceptance" was agreeably solved by "Negotiatio" in the opinion of most owners (60.98%) and contractors (60.29%), whereas the minority of consultants (42.86%) preferred this method. In the case of the "Project delay and cost overrun due to defective drawing" dispute root cause, a large number of consultants (20 people) and contractors (37 people) preferred "Negotiation" as a dispute resolution, unlike the owners, most of whom (52.63%) preferred other resolution methods.

With regard to "Project delay due to subcontractors' work abandoned", it was pleasingly resolved by a variety of resolutions, although all stakeholder groups preferred to resolve this issue by "Negotiation". The number of stakeholders preferring this resolution, were 13 people (or 34.2%) for the owners, 13 people (or 48.15%) for the consultants, and 25 people (or 37.31%) for the contractors. Regarding "Owners' payment delay", most owners (54.05%) preferred "Negotiation". The minority of the consultants (44.44%) and contractors (41.79%) preferred this approach.

Discussion

Root Causes of Disputes in Major Project Stakeholders' Comparative Perspectives

Contractors' Lack of Project Staff and Workers

Under a multifaceted and competitive environment coupled with underbidding and multilevel subcontracts, as well as demographic changes with an increase in aging dependency and a decrease in fertility (Suwanrada, 2009), the Thai construction industry currently faces project staff and native worker shortages. Most Thai construction laborers come from neighboring countries. The import procurement fees for them are high and are related to multi-departments of the national and local governments. Therefore, the number of laborers and supervisors who are employed is of concern in terms of cost controlling rather than project productivity, as long as the contractors are confident that the projects are completed by the contractual date. The viewpoint of consultants was similar to the contractors, since they closely supervised and controlled the projects.

On the other hand, the owners were concerned about the commercial operation date (COD) which involved the starting point of the project cash inflow affecting the entire project's finance. A lesser number of staff and workers may result in a delay of a project's COD. As a result, the rank of disputes arising from "Contractors' lack of project staff and workers" was high, since all major stakeholders understood the limitation of the industry. The project owners, however, were more sensitive to this issue than the project contractors.

Project Delay and Cost Overrun Due to Defective Drawing

The finding confirmed the studies of Cakmak and Cakmak (2014) and Cheng *et al.* (2009) that "Project delay and cost overrun due to defective drawing" resulted in a project dispute. According to the research finding, this cause had the most impact to a project's cost and frequently happens as the third rank in the opinion of the contractors. The contractors indicated that errors in design were involved in constructability, consistency, and clarity. A process of redesign took time, whether the contractors redesigned by themselves or sent the drawings back to the designers to be remade. The former needed the request for approval procedures, while the latter required the request for information process.

In contrast, according to the project owners' and consultants' perceptions, the contractors, in bidding for project works, had examined the drawings in order to do a quantity survey,

select the construction method, and plan the construction works before they made the construction proposal for tendering. The imperfect drawings were, therefore, considered and detected. Consequently, the owners and consultants overlooked this issue, while the contractors viewed this issue as the most important barrier to obstruct their efficiency.

Project Delay Due to MEP Works

This finding was a consequence of "Project time delay and cost overrun due to defective drawing". Most construction projects faced inconsistency with structural work and MEP work. This was because, once architects had finished their design work, the blueprint of these designs were concurrently sent to structural and MEP engineers. Then, these engineers computed and designed according to their expertise. After engineering designs were finished, all drawings were collected by the architects in order to prepare the bidding documents.

Drawing inspection is, therefore, a must at the earlier stages. In addition, during project execution, the absence of the main contractors' coordination coupled with the lack of the MEP subcontractors' cooperation, some structural parts of projects may face demolition by or have to wait for those subcontractors to put in, e.g., a sleeve joint. These amendments and suspensions lead to overshooting a project's scheduled goal. Thus, the impact of "Project delay due to MEP works" was high based on the contractors' perception.

Owners' Payment Delay

This finding echoed the research of Cheng *et al*. (2009) and Cakmak and Cakmak (2014). Payment delay was one of the root causes of disputes. The result of this study showed the frequency of occurrence was low in the eyes of all stakeholders. However, the impact is quite high from the consultants' and contractors' viewpoints. This was because the delay in project payment resulted in the contractors' inability to pay for labor and material costs causing the project's slowdown. Usually, the contractors simultaneously implemented several projects under resource limitations, and uncontrollable weather and economy conditions. Delay in payment in one project may result in suspending the progress of others.

Besides, there was sometimes a shortfall in the owners' capital venture. Progress payment, to some extent, came from the owners' liabilities. The creditors' inspection process influenced the payment. Moreover, unclear documents in contractual payment clauses, insufficient communication between the contractor, owner, and creditor, and misunderstanding the project's progress payment milestone brought about payment delays. Consequently, the contractors have suffered from these unforeseen and unexpected situations.

Preferred Root Causes of Dispute Resolutions

The findings, to some extent, reflected the studies of Jannadia *et al*. (2000), Ng *et al*. (2007), and Cheng *et al*. (2009). Speed, fairness, economy, expertise, privacy, practicality, and business relationship were considered when the project stakeholders decided to select the dispute resolutions. The preferred dispute resolutions in this study among stakeholders were:

Negotiation

This resolution is the most popular to resolve construction project disputes because it is timely, economical, and controllable. Effective negotiation involved communication and interpersonal skills. When each party tended to act in a way that brought about the most logically desirable outcomes for him, whoever had to negotiate with him needed to understand the contractual parties' responsibilities, roles, and obligations according to the contractual agreements. According to the agreements, the expected outcome referred to the project's original objectives rather than the party' benefits.

The negotiation started with a meeting between both disputants in order to share their information based on to what difficulties each party faced. Both parties would try to find a win-win solution because finding a new party to remake the project was costly. In addition,

according to Thai culture's value of personalism, Thais are much more relationship-oriented than task-oriented (Runglertkrengkrai and Engkaninan, 1987). Disputes, based on misunderstanding of the drawings, specifications, and contract agreements, rather than deception were often compromised. As a result, negotiation is the most favorable solution in Thai construction disputes.

Conciliation

Conciliation was applied when contractual agreements were ambiguous and both disputants were confident about what they had determined in these agreements. The agreements defined the relationships between the parties as well as their responsibilities, roles, and obligations. Due to the fact that a contract administrator had the pressure of time limitation in contract document preparation, a set of previous project contract documents or contractual standard forms might be used as the prototype of the current project contract documents. By using the "save as" and "adding and deleting" method, the contract contents were sometimes inconsistent with one another. The construction contracts are often long and complex documents. The contract language, especially the legal terms, is also hard to understand. The disputants tended to interpret the contractual clauses in a way in which they gained the benefit or at least did not lose anything. As a result, when the disputants faced difficulties in the disparity of contractual interpretation, conciliation with an attorney's assistance was unavoidable.

Conclusions

The conflict of interests among the major stakeholders in construction projects causes disputes to be inevitable. The evolution of dispute occurrences and the effective remedies were therefore investigated as the objectives of this study. In order to achieve the project goals, the research was started with an intensive review of related literature and analysis of the dispute root causes in the Thai Supreme Court. An in-depth interview and the percentages of agreement among expert judgment of content validity were the qualitative approach of the study. The survey method as a quantitative data collection was used. Then, the Kruskal-Wallis H test (KWt) and Mann-Whitney U (MWU) test were applied in order to scrutinize the different viewpoints of the root causes of disputes in terms of occurrence frequency and impacts on the project costs. The findings from the KWt showed that the frequency/impacts of "Contractors' lack of project staff and workers", "Project delay and cost overrun due to defective drawing", and "Owners' payment delay" dispute root causes were viewed with significant disparity by at least 2 stakeholder groups. In addition, there also were at least 2 parties differently perceiving the impact of the "Project delay due to MEP works" dispute root cause.

The results of the MWU test that was conducted to scrutinize the results from the KWt in terms of identifying which parties have different attitudes, indicated that the owners and contractors had different experiences in the frequency/impacts of "Contractors' lack of project staff and workers", "Project delay and cost overrun due to defective drawing", and "Owners' payment delay". This includes the impacts of "Project delay due to the MEP works" dispute root cause. In addition, the owners and consultants had a different point of view in terms of the frequency/impacts of "Contractors' lack of project staff and workers" dispute root causes and the frequency of the "Owners' payment delay" dispute root cause. The "Project delay and cost overrun due to defective drawing" dispute root cause impact was differently perceived by the consultants and contractors.

Furthermore, all stakeholders agreed that "Negotiation" was the most preferred dispute resolution. It is expected that the findings of this research will increase Thai construction productivity.

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