MINIMIZING DISPUTES IN CONSTRUCTION INDUSTRY: ANALYSIS OF PROCUREMENT ARRANGEMENT

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Dissertation submitted in partial fulfillment of the requirements for the degree of Master of Science in Construction Law & Dispute Resolution

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DECLARATION

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ABSTRACT

The goal of every construction project stakeholder is the completion of a project that meets the objective of time, cost and function. However the construction process is often fraught with disputes. Because of differences in perception and frequently of conflicting goals among partners to a project, conflicts in the construction project environment are inevitable. However, conflicts can quickly turn into disputes if not properly managed. These unresolved disputes can lead to programme delay, increased tension, and can damage long term business relationships.

According to the theory, dispute occurrence is differing within different procurement arrangements. However, there is no empirical study carried out based on disputes within different procurement arrangement in Sri Lankan context. Therefore this research has carried out to provide suggestions to minimize disputes in different procurement arrangements.

Multiple case studies has been carried out by using four construction projects; two projects on traditional procurement method and two on design and build procurement method. During data collection semi structured interviews were conducted with professionals involved in four projects.

Analysis of cases indicates that, among the two procurement methods most of the disputes were raised due to deficient management, supervision and coordination effort of the Client, variations initiated by the owner, poor communication among project team, poor interpersonal skills, Lack of team spirit and lack of design management. There were no any significant difference between causes of disputes among projects procured under design & build procurement arrangement and traditional procurement arrangement. Therefore the research indicates that rather than expecting less disputes considering the project procurement method effort should be taken to avoid disputes by putting proper structure to handle the disputes within the project. Finally suggestions were made to minimize the disputes in construction projects which were procured under traditional and Design & Build procurement methods.

Key Words: *Disputes, Procurement Arrangement, Sri Lankan Construction Industry*

DEDICATION

I dedicate this dissertation to my beloved parents and sisters, who have being the utmost inspiration and light of my life…

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This research is accomplished owes much devotion and admiration to many people who have contributed in numerous ways. Although it is difficult to point out each as individuals, but it is my duty to extend my gratitude to all of them who endeavor. First and foremost respectively, I greatly indebted my supervisor Mr. Mahesh Abeynayake for the given interest, encouragement, gentle guidance and invaluable support offered through out of this study.

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Munaweera C.J
08th September 2018

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ABBREVIATION

Abbreviation	Description
BOQ	Bill of Quantities
CVI	Confirmation of Verbal Instructions
D&B	Design and Build
GDP	Gross Domestic Product
ICC	International Chamber of Commerce
PA	Procurement Arrangement
QS	Quantity Surveyor
SL	Sri Lanka

1.0 INTRODUCTION

1.1 Background

Construction project is well-defined as a process with certain time period and interrelated activities from start to finish (Jayalath, 2010). Tazelaar and Snijders (2010) identified construction industry as a harsh and tough industry due to pressures and competitiveness in the industry. The goal of every construction project stakeholder is the completion of a project that meets the objective of time, cost and function. However, the construction process is often fraught with disputes (Maritz, 2009). Because of differences in perception and frequently of conflicting goals among partners to a project, conflicts in the construction project environment are inevitable. However, conflicts can quickly turn into disputes if not properly managed (Cheung and Suen, 2002). Further, Kassab (2010) stated that construction exists in an adversarial environment and that conflict is unavoidable on projects. According to Chin (2003) prominently claims or potential claims may lead to conflicts as well. According to Hasanzadeh, Esmaeili, Nasrollahi, Gad, Douglas and Gransberg, (2018), disputes are common in the construction industry and lead to unnecessary cost and schedule overruns in projects. Further, Kilian and Gibson (2005, cited Oladapo and Olabanjo, 2009), indicated the parties often view the construction process from differing perspectives and it is therefore not uncommon for a dispute to arise. Marzouk and Moamen (2009) stated that disputes and claims often arise as a result of the increasing complexity of construction processes. With the increase in the number of participants in a construction project, more business interactions and arguments end up with an increase in the number of construction disputes (Kumaraswamy and Yogeswaran, 1998 cited Chan and Suen, 2005).

If not properly managed, disputes may lead to project delays, reduced team spirit, increased project cost, and damaged business relationships (Chan and Suen , 2005). According to Seifert (2005) international construction disputes represent a significant number of disputes arbitrated in the international commercial arbitration system, accounting for almost 20% of all disputes referred to the International chamber of

commerce (ICC) each. Further, Greenwood and Yates (2006) mentioned that in retrospect to the construction industry of past half century of United States, it is inevitable to identify a vast number of cases had been referred to litigation.

Therefore, it emphasis the requirement for minimize the disputes in construction industry. Fenn, Lowe and Speck (1997) reckoned that any attempt to resolve conflict expeditiously, economically and effectively should start as early as possible in the chain of events, focusing on the possibilities of prevention rather than curing. Thus it is necessary to illustrate that it is essential to focus on conflicts in the early stages.

The construction project brings together individuals and/ or organizations that are separate and disparate to form what has been termed a temporary multi organization or a temporary project coalition (Rowlinson, 1999). According to Kenis, Panjaitan and Canbre (2009) in general circumstances success of the construction projects heavily depend on the collaboration of different individuals of different spheres. Dada (2012) stated that Procurement methods incorporate the organizational or legal/contractual arrangements of parties in the construction project to deliver the project. Further, Cox and Townsend (1998) stated that Procurement links the highly fragmented supply side of the construction industry with less fragmented demand side. Olanrewaju, Avavhe, Aziz, Chen and Han, (2016) stated that various types of procurement strategies reflect the extent to which the client is willing and able to bear certain levels of risk measure in terms of cost, quality, time and other criteria within the client value system.

According to Ashworth and Hogg (2007), different variants of procurement are available for meeting different clients' needs and projects specifics. Masterman (2002) identifies three categories of procurement systems in respect of building projects; the separated and cooperative procurement systems, the integrated procurement systems and the management-oriented procurement systems. Appiah, Morledge and Shelbourn (2010) mentioned that the traditional method, as implied by its name, is a project procurement method where the three sequential phases of design, bid and build are identified as separate tasks. The use of standard form of contract, standard methods of measurement and co-ordinated project information are all essential to the smooth functioning of the traditional system. According to Ogunsanmi (2004) Design and

build given the single point responsibility to the Contractor to carry out both design and construction of the project for the Client.

The traditional method has a major weakness of adversarial and confrontational relationships, claim consciousness and participants' conflicting loyalties (Odeh and Battaineh, 2002). According to Nawi, Lee, Azman and Kumar (2014) traditional construction process has been widely critized for its fragmented approach to project delivery and its failure to form effective teams thus created a number of issues such as reworks, time delay, rising costs, lack of communication and coordination, and wastages. Ndekugri and Turner (1994) stated the common perception among contractors and owners is that a single point of responsibility in DB projects should reduce the risk of litigation or arbitration. However, Dada (2012) stated that except in non-traditional procurement where participants on the construction projects can sometimes be under a single organization, the organizations for procuring the project are the client, Contractor and consultants who are different commercial or professional entities. Even in the non-traditional procurement method, where the project participants can be in the same organizations, the interactions on the project can lead to conflicts. Therefore, it is evident that with all the procurement methods and collaboration among parties involved it is still a fact that construction industry generating disputes. Accordingly, researcher identified the importance for minimizing the construction disputes considering the procurement arrangement.

1.2 **Problem Statement**

With reference to the literature related to the disputes in construction industry it is evident that disputes are reality in every construction project. Sri Lankan construction industry also facing the same scenario since the adversarial nature of the construction industry is common. Disputes in the construction projects leads to project delays, reduced team spirit, increased project cost, and damaged business relationships. This very context justify the requirement for manage these disputes early to prevent those disputes harming project objectives. In Sri Lankan context, even though literature had addressed on Causes of Disputes, Effects of Disputes, Alternative Dispute Resolution,

there is very limited researches which addressed the subject matter of minimizing of disputes. According to Yiu and Cheung (2006) prevention is better than cure as far as conflict resolution is concerned. The main reason for arising of disputes is different perspectives of the project stakeholders. The roles assigned to participants of the project depend on the procurement strategy adopted by the client. According to the theory, dispute occurrence is differing within different procurement arrangements. However, no empirical research has been carried out in Sri Lankan context regarding dispute performance based on Procurement arrangement and this research aims to fill the gap. Therefore the research problem set as "How to minimize the disputes arising out of different procurement arrangements"

1.3 Aim and Objectives

The aim of this research is to provide suggestions to minimize disputes in different procurement arrangements. In achieving the above mentioned aim the researcher has set the objectives as follows,

- Identify the causes for disputes in Sri Lankan construction industry
- Identify the effects of disputes in Sri Lankan construction industry
- Explore relationship between procurement system and disputes
- Suggestions to minimize the construction disputes within different procurement arrangements

1.4 Scope and Limitation

This research was limited to the Sri Lankan context. Only the Traditional procurement Arrangement and Design and Build Procurement Method was considered among the various procurement methods.

1.5 Research Method

The research has been carried out based on the following method:

Literature Survey

A comprehensive literature survey was carried out by referring books, journals, past dissertations and articles to identify the Disputes, dispute causes, effects of disputes in construction Industry, identify practical procurement methods in Sri Lankan construction industry, conflict cause of procurement arrangement and relationship between procurement arrangement and conflicts

Case Study

Case study method has been used to identify the reasons which will cause conflict situations when practice design and build procurement arrangement and traditional procurement arrangement in industry.

Data Analysis

In this research, detailed write-ups were made by analysing the patterns (interrelationships) of cases. Content analysis was used to analyse data and to identify the patterns of cases.

1.6 Chapter Breakdown

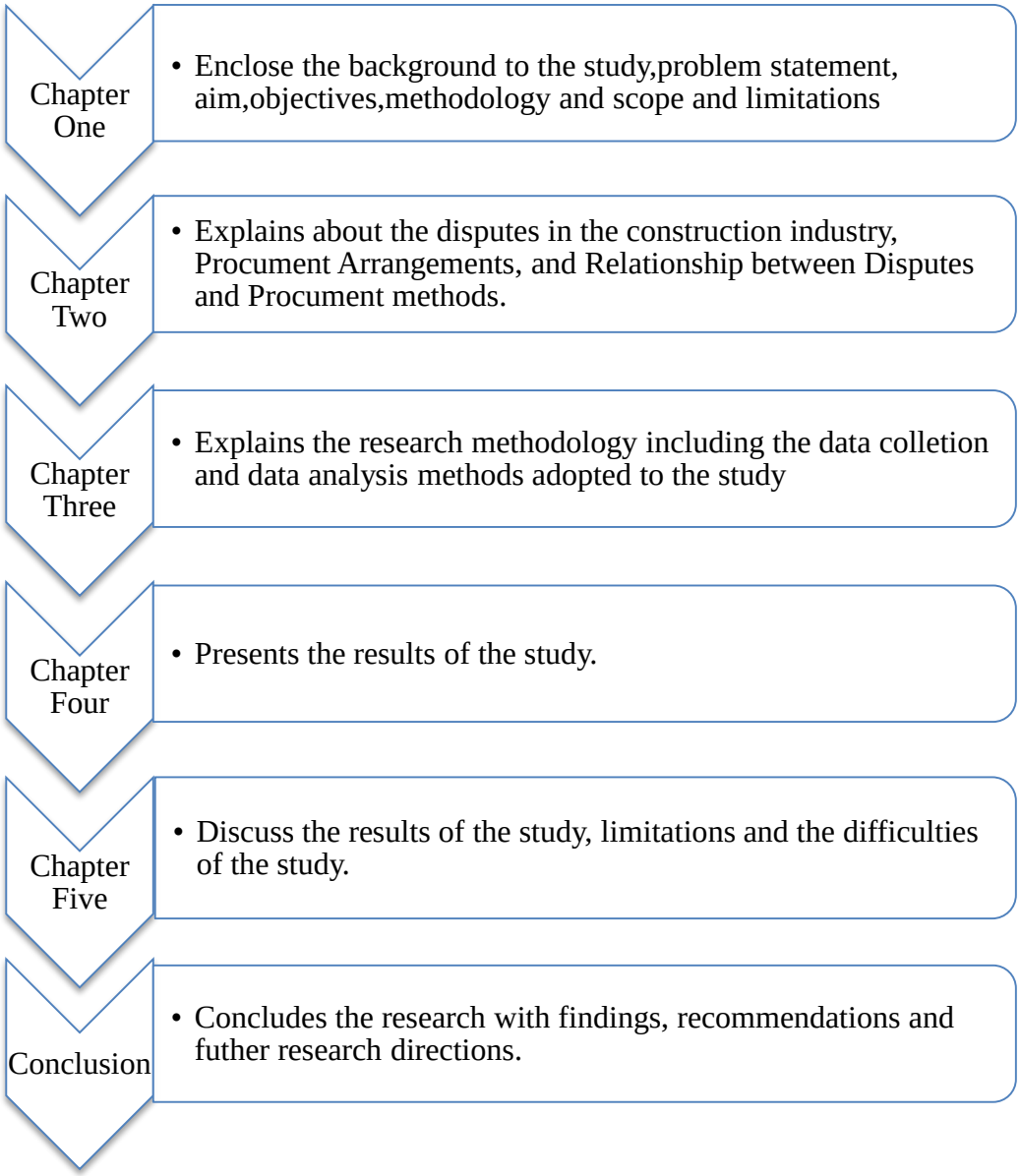

Figure 1-1: Chapter Breakdown

2.0 LITERATURE REVIEW

2.1 Introduction

This chapter review the current knowledge regarding the research area and establish context and particularize of the study. This chapter discusses a general introduction to disputes arises in the construction industry, dispute causes, and the effect of disputes for the project performance. Then this chapter introduces Construction Procurement arrangements in the Construction Industry and factors considering for procurement arrangement selection. Further it elaborates the risks in procurement practices.

2.2 Disputes in the Construction Industry

2.2.1 Conflicts

Conflict is described as "any divergence of interests, objectives or priorities between individuals, groups, or organisations; or non-conformance to requirement of a task, activity or process" (Gardiner & Simmons, 1992). In Cobuild English Dictionary (1995, cited Chain , 2003) conflict defined as "serious disagreement and argument about something important" and also as "a serious difference between two or more beliefs, ideas or interest". Further, (Mitkus & Mitkus, 2014) also defined conflit as struggle between at least two independent parties who understand incompatible goals, scare resources and obstruction from other achieving those goals.

Conflict is natural and inevitable in all organizations and that it may have either a positive or a negative effect, depending on how the conflict is handled (Verma, 1998) And also conflicts and disputes in construction sites affect performance of all the participants, e.g. owner group, design and supervision consultant team, contractors, subcontractors, suppliers, labour force (Acharya, Lee, & Im, 2006). Kumaraswamy, (1997) reasoned that such disagreements or conflicts could be beneficial in some instances to establish better alternative solutions. Nevertheless according to project management context, conflict need to resolution mode such as confronting, compromising, smoothing, forcing, or avoiding before escalate in to claims or disputes

(Chong & Zin, 2012). Further, (Donohue & Kolt, 1992) recognized the following four elements which are concerned to be important reference points in understanding conflict situation,

- **Interdependence:** Conflict require interdependence and its often promotes interdependence as parties continue to fight, this is because the moment that parties enter conflict, or have the potential for conflict, they assume the ability of to affect one another's thoughts and or behaviours.

- **Manifest-Latent:** Conflict also varies according to the extent to which it is out in the open (manifest) or hidden (latent) from view. Manifest conflict is a sign that people have difference and they need to express them, whereas latent conflict consists of differences that remain hidden, which is sort of habit of not exposing differences.

- **Needs and Interests:** Needs are basic human desires tied to self-concept or self-esteem, interests, on the other hand, are desire that life apart from an individual's self-concept.

- **Interference:** Conflict is triggered by received interference. When both parties see the other as standing in the way of goal attainment, conflict flares up, however, when parties feel no need for conflict if they perceive no resistance to their goals.

2.2.2 Claim

Claim refers specially to the situations where a conflict or problem has been written up in the document for review by another party and still has to possible to be resolved at the field level (Gebken, 2006). Kululanga, Kuotcha, Mcaffer, & Edumfotwe, (2002) argued in construction industry claims are submitted by the innocent party and caused several reasons to happen claims. This may result to delaying projects and increasing the project costs. According to (Fulton, 1989), conflict are not synonymous with

dispute although in ordinary parlance the two words are used interchangeably in the construction industry. Conflict is the precursor to a dispute.

2.2.3 Dispute

Dispute is often regarded as a form of conflict that is made public and requires resolution (Brown and Marriott, 1999 cited Cheung & Suen, 2002). Further Eilenberg ,2003 cited Danuri, Hussain, & Jaafar, (2010) has described a dispute as major disagreement, which cannot be resolved by the parties without recourse to a formal process and outside assistance. According to Diekmann and Girard (1995) dispute is any contract question or controversy that must be settled beyond the jobsite management. Also Oladopo and Onabanjo (2009), stated that "disputes arise when parties to a contract cannot agree on the interpretation and implementation of contractual clauses during execution of the contract". According to Cheung and Pang (2013) Construction disputes can either be contractual or speculative. Researcher further stated that, rooted in an incomplete contract, risks, uncertainties, and collaborative conflicts would evoke contractual dispute and rooted in an incomplete contract, speculative dispute emerges with opportunistic behaviour or affective conflict.

2.2.4 Interrelationship among Conflicts, Claims and Disputes

Lowe (2007) develops a useful graphic to define the relationship between conflicts, claim and disputes. Figure 2.1 shows how conflict can lead to disputes and claims can in turn lead to disputes when settlement cannot be reached.

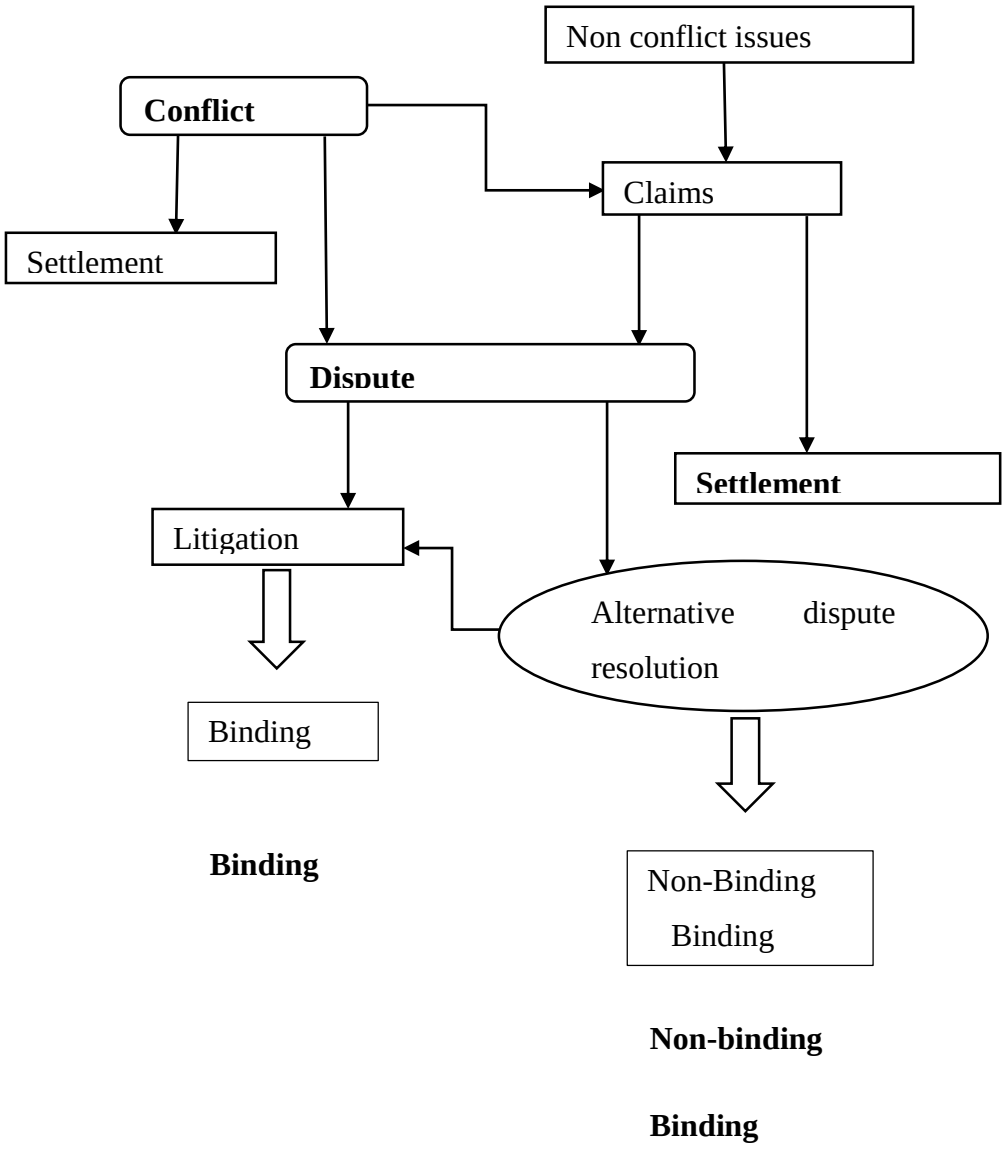

Figure 2-1: Conflicts, Claims and Disputes

Source: Lowe, (2007)

2.3 Nature of the Disputes in Construction Industry

Unlike other types of industries where the development and manufacture of product can be standardized and tested before being purchased, the nature of projects in the construction industry is extremely diverse (Younis, Wood, & Malak, 2010). Construction project have less possibility to fully design before commencement the contract. (Marzouk & Moamen, 2009) depicted construction disputes are characterized by features that differentiate them from other types of disputes. These features are,

- Involvement of several parties (apart from general contractor and owner) who might be involved in more than one contract,
- The associated issues of the dispute are diverse, numerous and complex
- The events leading up to the dispute may take place over months, or even years.

The construction industry is enriched by the presence of other parties with an interest in the end result, such as the funder, the developer, the planning authority, the construction regulators and the aesthetically (Chain , 2003). Moreover, it is a multi- party process where numerous specialist parties are involved due to the diversity of skills required and thus maintaining teamwork atmosphere and controlling potential conflicts is important (Wood, 2001). Maintaining a cooperative environment becomes a difficult task because conflicts are inherent in construction projects. Further, construction industry has higher uncertainty and involves more unknowns and due to that high possibility to rise to contractual disputes (Kumaraswamy, 1997).

As mentioned by (Armes, 2011) disputes are always costly to the projects. The resources that could have been spent on the dispute resolutions can be invested in the same project to better performance of clients and users.

2.4 Causes of Construction Disputes

Disputes are one of the main factors which prevent the successfully completion of the construction project. Thus, it is important to be aware of the causes of disputes in order to complete the construction project in the desired time, budget and quality (Cakmak & Cakmak, 2014). Diekman & Girard (1995) **e**xamined the effect of three categories of project characteristics on the occurrence of contract disputes as people aspects, process aspects, and project aspects. As indicated in the figure 2.1, causes of disputes can be contractual disputes can be separated in to root causes and proximate causes (Kumaraswamy, 1997). According to the Kumaraswamy and Yogeswaran (1998), sources of construction disputes are mainly related to contractual matters including variation, extension of time, payment, quality of technical specifications, availability of information, administration and management, unrealistic client expectation and determination.

McInnis **(**2007 cited Marzouk, Mesteckawi, & EI-Said, 2011) has analysed several factors which causes construction disputes including; technical, climatic and logistic events, while resolution of construction disputes is influenced by people's motivation, behavioural and cultural implications. Further, Cheung and Yiu (2007), identified dispute sources in two different category as construction related and human behavior related. Williamson (1975) further opined that a contract is inevitably incomplete due to bounded rationality and information asymmetry. As such, construction dispute minimizing efforts can focus on non-contractual mechanisms such as building commitment and trust. These endeavors are not easy but would positively alleviate the task and people factors (Cheung & Pang, 2013). Thompson, Vorster and Groton (2000) indicated that disputes arise due to lack of communication, distrust, misinterpretations of contracts, uncertainties of role and responsibilities and imbalance in risk allocations. Further Mahamid (2016) identified severe direct dispute causes are delay in progress payment, unrealistic contract duration, change orders, poor quality of completed works, and labor inefficiencies while indirect causes are inadequate contractor`s experience, lack of communication between construction

parties, ineffective planning and scheduling of project by contractor, cash problems during construction and poor estimation practices.

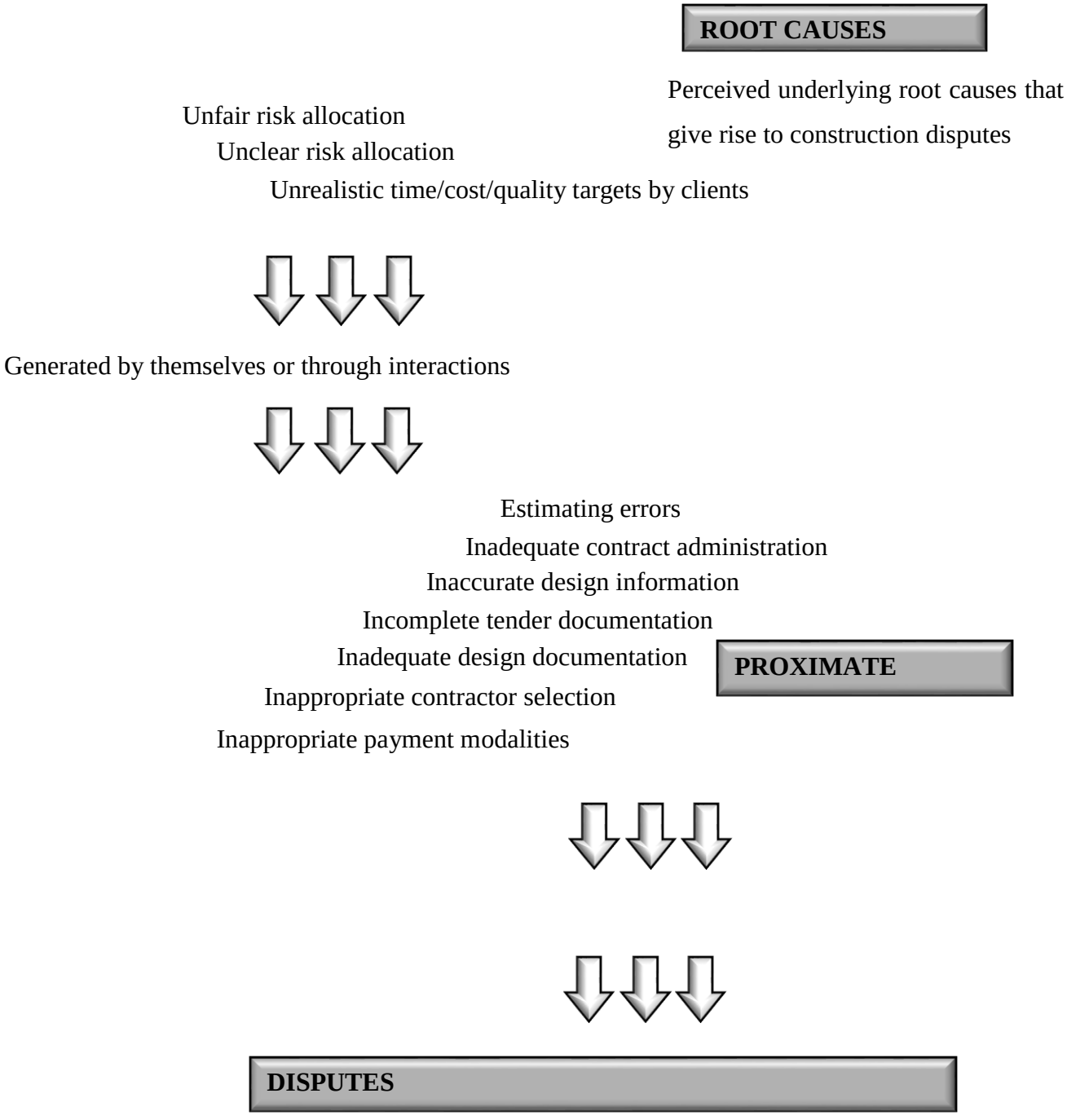

Figure 2-2: Common sources of construction dispute

Source: (Kumaraswamy, 1997)

According to the Literature review in the context of Disputes, most of the causes of disputes are common in the Construction Industry. Table 2.1 shows causes of disputes which have categorized under 7 categories.

Table 2-1 : Causes of Disputes

Categories of Disputes	**Researcher**	**Causes of Disputes**
Owner/Client related	Fenn (1997)	Failure to respond in timely Manner
		Poor Communications among members of the team
		Inadequate tracing mechanisms for request of information
		Deficient management, supervision and coordination effort on the part of the project
		Lowest price mentality in engagement of contractors and designer
		The absence of team spirit among the participants
		Reluctant to check constructability
		Clarity and completeness
		Discrepancies and ambiguities in contract documents
	Cakmak & Cakmak (2013)	Variations initiated by the owner
		Change of scope
		late giving possession
		Acceleration
		unrealistic expectations
		payment delays
Contractor Related	Carmicheal (2002)	Inadequate contractor's management, supervision and coordination
		delay or suspension of works
		failure to plan and execute the changes of works
		failure to understand and correctly bid or price the works

		lack of understanding and agreement in the contract procurement,
		reluctance to seek clarification and inadequate critical path method (CPM) scheduling and updated requirements
	Sambasivan & Yau (2007)	Inadequate planning by the contractors
		improper site management by the contractors,
		Inadequate project handling experience of contractors
	Jaafar, Abdul Tharim, & Shuib (2011)	Delay in the payments for work completed directly affect the completion of the project and result in overrun of time
		Quality of work
		Error of pricing or costing
		late instruction from architect or Engineer
	Cakmak & Cakmak (2013)	Delays in work progress
		time extensions
		financial failure
		technical inadequacy
		tendering and quality of work
Consultant/Design related	Hall (2000)	Failure to understand its responsibilities under the design team contract
		over request of information's
		design and specification oversights
		errors or omissions resulting from uncoordinated civil, structural, architectural, mechanical and electrical design
		Incompleteness of drawing and specifications
	Cakmak & Cakmak (2013)	Design errors
		inadequate /incomplete specifications,
		quality of design

		availability of information
Contractual matters	Hellard (1987)	Lack of perfection in the contract documents,
		failure to account the cost and the psychology of people in construction
	Kumaraswany & Yogeswaran (1998)	Variation
		extension of time
		payment
		quality of technical specification, availability of information
		administration and management and unrealistic client expectation and determination
	Jaafar et al. (2011)	Delay interim payment from client, ,
		client fails to respond in timely manner
		application of extension of time and improper project schedules
	Cakmak & Cakmak (2013)	Ambiguities in contract documents,
		different interpretations of the contract
		risk allocation and other contractual problems
	Mitropoulos & Howell (2001); Diekmann et al., (1994)	Project uncertainty, which cause change beyond the expectation of the party
		Process problems, which includes imperfect contracts and unrealistic performance expectations
Project related	Cakmak & Cakmak (2013)	Site conditions
		Unforeseen changes
Human Behavioral related	Mitropoulos & Howell (2001); Diekmann & Girard (1994)	People issues
		Problems owing to poor communication
		Poor interpersonal skills
		Opportunistic behaviour and cognitive dissonance
	Jaafar et al. (2011)	Poor communication among project team
		multicultural team problem

		reluctant to check constructability
		Clarity and completeness of project
External Factors	Cakmak & Cakmak (2013)	Lack of communication
		lack of team spirit
		adversarial or controversial culture
		Weather
		legal and economic factors
		fragmented structure of the sector

Source: (Hussin and Ismail, 2015)

(Ranjithkumar, 2005) has identified following reasons as causes of disputes in Sri Lankan construction industry.

- Breaches of contract by any party to the contract
- Unforeseen and unusual adverse weather conditions
- Inadequate financial strength of any of the parties to the contract
- Inadequate administration of responsibilities by the owner or contractor or sub-contractors
- Plans and specifications that contain errors, omissions and ambiguities
- Fluctuations: Sudden tax and cost increases due to sudden economic changes.

Further, Abeynayake (2008) identified breaches of Contract, inadequate administration of responsibilities, plans and specifications that contain errors, omissions and ambiguities, sudden tax and cost increase as main reasons for disputes in Sri Lankan Construction Industry.

2.5 Effects of Contract Disputes

Cheung & Suen, 2002 stated that if the constructions disputes are not properly manage, those are cause to the project delays, increase project costs, undermine team spirit and damage business relationships. Ayudhya (2011) supported this view arguing that disputes are insidious and if not avoided often resulting time overrun, cost overrun, deterioration of the quality of product to be delivered, loss of productivity, reduction in investment profits and damage continues business relationships. Fernandezsolis, 2008 shown that, when a dispute arises during the execution of the project, it can affect to fulfill objectives and the business relationships between the contract parties to the project. According to (Marzouk & Moamen, 2009) disputes may cause owners to lose their investment revenue because of the associated delays. They also have negative impacts on contractors since projects delays are associated with an increase in materials and labour costs. In addition, disputes decrease the ratings of contractors in financial prequalification evaluations.

2.6 Construction procurement systems

Procurement comes the word procure which literally means "to obtain by care or effort"; "to bring about" and "to acquire" (Rashid,Taib,Nasid & Zainordin, 2006). Furthermore, author says that, system is about "organized method, approach, technique, process or procedure". In this context, project procurement is very much concerned with the organized methods or process and procedure of obtaining or acquiring a construction product. Further, studies of the (Love, Earl, & Skitmore, 1996) and Masterman, (1992) identified procurement system as a key means through which the client creates the pre-conditions for the successful achievement of project specific objectives. According to Kumaraswamy and Dissanayaka (2001), a procurement system provide a strategic framework whereby a construction project is brought about, responding to the distinctive needs of the client, project, and external environment.

The procurement of construction project is vast in scope because it involves the gathering and organizing of myriads of separate individuals, firms and companies

to design manage and build construction products such as houses, office buildings, shopping complex, roads, bridges etc. for specific clients or "customers" (Rashid *et al*., 2006). It also involves arranging and coordinating people to achieve prescribed goals or objectives. Masterman (2002), described project procurement as the organizational structure needed to design and build construction projects for a specific client. According to Rowlinson, 1999 cited **(**Dada, 2013**)** the construction project brings together individuals or organizations that are separate and disparate to form what has been termed a temporary multi-organization or a temporary project coalition.

There are a number of options available for procurement of construction work. The main differences between the options include the payment mechanisms and risk allocation between the project participants (Wamuziri & Seyright,2005). According to Babatunde, Opawole & Ujaddughe (2010), the major requirement of time and cost reduction in project delivery have resulted in the evolution of the several variants of procurement method, and at present, there are more than a handful of procurement methods, all with the major aim of meeting a quality product delivery at economical cost and time. Further, Olanrewaju, Anavhe, Aziz, Chen& Han (2016) stated that the various types of procurement strategies reflect the extent to which the client is willing and able to bear certain levels of risk measure in terms of cost, quality, time, and other criteria within the client value system. The selected procurement strategy must ensure that risk is transferred to the best parties that can covert the risk/liability to assets.

Various authors have provided their respective classifications of the available procurement methods. The procurement methods according to literature can be identified as Traditional, Design and Build, Build -Operate -Transfer, Management Contracting, Construction Management, Labor Only, Direct Labor, Partnering, Public Private Partnerships, Strategic Alliances, Private Finance Initiatives, Collaborative Agreements, Concessions etc. (Latham, 1994; Mathonsi and Thwala 2012) . Further, Masterman (2002) identifies three categories of building procurement systems namely the separated and cooperative procurement systems, the integrated procurement

systems and the management-orientated procurement systems. The procurement systems practiced in current construction industry can be presented as follows.

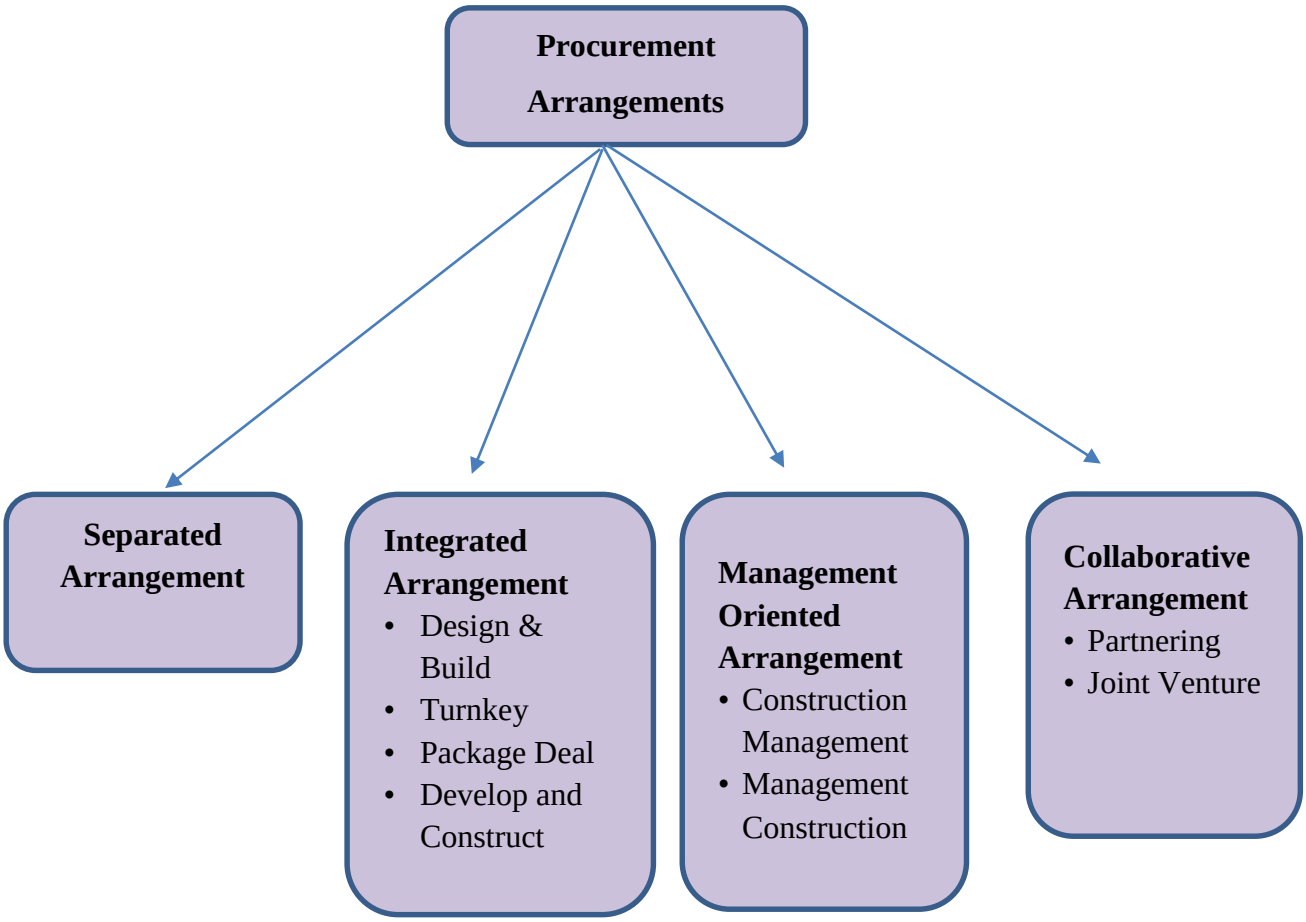

Figure 2-3: Procurement arrangement systems

2.6.1 Separated Procurement Arrangement

In separated procurement arrangement there is clear rigid separation of design and the construction. Normally in this method construction started after the design is completed. Client first appoint a consultant to do the design after design is fully completed then after tendering procedure a contractor is selected to carry out the project (Ashworth, 2002). In general, design-bid-build is recognized as traditional contracting system and it is the most common form in delivering the construction project (Gehrig, 2006 cited Hai, Yusof, Ismail & Wei, 2012). Under the traditional

approach, the principal (owner) has separate contractual relationships with the contractor and the architectural designer and there is no contractual relationship between the designer and contractor (Bunting 2011 cited Francis & kiroff, 2015). Designers and contractors work as separate independent organization for responsibilities of design and construction of the project in this procurement arrangement system. Linear or sequential contracting system or multiple responsibilities contracting approach are shown in these arrangements at some times. It is a system where the project development activities that start from feasibility study, preliminary design, documentation to construction and hand over, are carried out sequentially one after another. Under this system working drawing should prepare before the start of actual constructions (Rashid, Taib, Ahmad, Nasid , & Zainordin, 2006)**.** It is sub-divided into two sub- categories – Traditional System and Variants of the Traditional Systems. The Variant System is further sub-divided into Sequential Method and Accelerated Method (Rashid, Taib, Ahmad, Nasid , & Zainordin, 2006)

According to Davis,Love and Baccarini (2008) the traditional procurement method, using two-stage tendering or negotiated tendering, is sometimes referred to as the 'Accelerated Traditional Method' – this is where the design and construction can run in parallel to a limited extent. Whilst this allows an early start on site, it also entails less certainty about cost. There are three types of contract under the traditional procurement method

- Lump sum contracts: where the contract sum is determined before Construction starts and the amount is entered in the agreement
- Measurement contracts: where the contract sum is accurately known on completion and after re-measurement to some agreed basis.
- Cost reimbursement: where the contract sum is arrived at on the basis of the actual costs of labor, plant and materials, to which is added a fee to cover overheads and profit.

Masterman (2002), identified some basic characteristics of traditional procurement system, which are:

- Project delivery is a sequential process.
- The design of the project is largely completed before work commences on site.
- The responsibility for managing the project is divided between the client's consultants and the contractor, and there is therefore little scope for involvement of either of the parties in the other's activities.
- Reimbursement of the client's consultants is normally on a fee and expenses basis, whereas the contractor is paid for the work completed on admeasure or lump sum basis.

Onasakponome, Yahya, Rani, shaikh (2011) said, Traditional procurement system should be used when

- Product quality is wanted;
- Price certainty is wanted before the start of construction;
- A programme allows sufficient time;
- A balance of risk is to be placed between the client and contractors; and
- A client wishes to appoint designers and contractors separately.

Furthermore, apart from the above mentioned factors Kelvin (2010) identified the following factors as well;

- The client should have a clear understanding of the project design
- The client or its consultant has to have greater expertise in the field to prevent "buildability" problems arising during the construction stage
- The project would ideally be a standard process using mature technology
- There is no requirement of client involvement in the construction stage When vary from this situation in in the PA implement, should to do adjustment as according to related factors. If not, it can be cause to conflict in the project at future.

Tey, Aminah, syuhaida, & Lee (2012) stated that, Design-bid-build is characterized by fragmentation, uneven risk allocation, lowest-bid-price and multi-layer of subcontracting that discourages coordination in a project. According to Madelsohn, 1997 cited Tey et.al, (2012), 75 % of the problems on the construction site are generated in the design phase. Nevertheless, its origin can be traced back to the adversary nature of traditional contractual arrangement. Kubicki, Bignon & Halin (2006) claim that contractual arrangement plays a pivotal role in risk minimization in construction. This can be explained through the duties and responsibilities of a party depending on individual contractual arrangement (Greco, 2006 cited Hai et al,2012), which have a significant impact on the risk allocation to project participants. Due to the uncommon responsibilities by separate contracts, lack of commitment and blame culture appears among participants, which ultimately leads to the challenges of coordination among them (Kubicki et al,2006) According to Plusquellec, Lehoux & Cimon (2017), Design-Bid –Build (DBB) delivery system is still far from perfect since most of the construction projects have to face some cost increases and schedule overruns which can be harmful for the owner.

2.6.2 Integrated Procurement Arrangement

Mathonsi and Thwala (2012) identified the integrated Procurement Arrangement as a system where one organization takes responsibility for the design and construction of the project and the client deals only with one organization. In an integrated system the design and the construction clearly integrated each other. In this method normally construction started while the design is ongoing. The contractor enters into separate agreements with consultants, to complete the project according to agreement. According to Ashworth (2001), responsibilities of design and construction of the project taken by one party as the name implies ‘‘integrated‘‘. Both responsibilities are contracted out to a single contracting organization. Also it is called a parallel or single responsibility procurement system whereby the client will only need to deal with a single organization for both the designing and constructing the proposed project.

2.6.2.1 Design and Build

Under the DB system the contractor is responsible for design as well as construction. The important characteristic of this system is the single point responsibility of the contractor for the entire project execution by taking up the role of both the professional design team and the

In Design and Build procurement arrangement, the responsibility of the design and the construction is on single organization. The client signs only one contract, thus this form is the most straightforward from the perspective of responsibility and communication (Onasakponome, Yahya, Rani, shaikh 2011). The organization in charge of the project will likely deliver the greatest performance benefits to the client through innovation, standardization and integrated supply chain. Furthermore, many surveys have established that clients perceive the design and build system as providing better value for money, and giving rise to less disputes than other procurement systems, and the surveys also suggest that, an experienced client with a clear brief can use it satisfactorily with projects of most sizes (Onasakponome, Yahya, Rani, shaikh 2011). Advantages of this method are supporting innovative solutions, being cost effective, combining the expertise of the design and construction professionals, and reducing administrative work of the client (Ruparathna & Hewage, 2015)

(Onasakponome, Yahya, Rani, shaikh, 2011) said, Design and Build procurement system should be used when:

- A firm price is needed in advance of construction;
- A brief for scope design is unlikely to change;
- A single organization is required to take responsibility and risk for design and construction; and
- A programme can be accelerated by overlapping design and construction.

Furthermore, apart from the above mentioned factors Kelvin (2010) identified the following factors as well,

- A project with a tight schedule
- A project requiring a high price certainty
- The contractor is more experienced with design work and managing similar kind of projects
- Typical construction where standardized techniques and materials are to be used
- The scope of project is clearly defined

D&B procurement system is suitable at the above points of situation, when deviate from those it will cause to conflict in future to the project.

According to Walker and Hampson (2008) negative impacts of this method are as follows:

- Inflated cost because bidding is being done with minimal design or site data
- Less attention towards the life-cycle costs; and
- Quality of construction work is highly dependent on the Contractor

According to Francis & Kiroff (2015) the biggest difference between design-build and traditional design-bid-build is the single point responsibility that exists under design-build. The principal engages with what is sometimes referred to as the design-build entity, so that the principal is not required to act as the middle man between the contractor and designer when a design-related dispute or omission arises, as is the situation under design-bid-build. Liability issues, which are clearly defined under traditional procurement, become less clear under design-build (Masterman, 2002) but nevertheless cause fewer lawsuits than the traditional procurement approach (Jackson, 2011). The common goal of the design-build entity results in a significant reduction in contractual claims for time delays or design omissions (Jackson ,2011) while under the traditional approach, the two parties often have conflicting interests and responsibilities, which can lead to conflict and blaming of the other party. According to Plusquellec, Lehoux & Cimon (2017) Design-Build outperforms design-Bid-Build

in terms of cost and schedule growth as well as in terms of delivery speed, all for similar quality.

2.6.2.2 Turnkey

The true turnkey contract includes everything from the inception design up to handover and the possible furnishing of the project by a single contractor. In some project it may also include the provision of a suitable site, prior to design and construction. An all- embracing contract is therefore formed with a single administrative entire building's procurement process. The promoter therefore expects to be able to walk in and take over the project which is then ready for use (Willis C.J., Ashworth & Willis, 1994).

2.6.2.3 Package deal

The package deal is a special type of design and build project in which the client chooses a suitable building from a catalogue. The client will also probably be able to view similar buildings that have been constructed elsewhere, of a similar design type of construction (Willis *et al*., 1994). Furthermore, Willis *et al*., (1994) illustrated that on occasion an architect may be independently employed to advise on the proposed building type selected or to supervise the works during construction. This may be particularly appropriate to those items that are outside the scope of the system superstructure.

2.6.3 Management oriented systems

The need for greater control of project cost and the client requirement of higher standards of quality, together with the demand of earlier commencement and complete on times are the major drivers contributing to the popularity of management contract routes (Kelvin, 2010). A definition of "management contracts" given by Broome (2002, p.79) is

"The management contracts are those in which the client employs a contractor as a management professional, on a fee basis, to manage on its behalf the different work packages that make up a project" (cited Kelvin, 2010).

In this system, the management of the design and construction a project is contracted out to a contractor who acts as a management consultant on behalf of the client (Masterman, 2002). Therefore, this system that gives greater emphasis on the management and integration of the design and construction of projects. Onasakponome *et al*., (2011) recognize this method should use at:

- Flexibility in design is wanted to allow for changes to be made as the process of design and construction are carried out;
- A client and his advisers have insufficient management resources;
- Maximum price competition for the works element is wanted; and
- An early start to construction and early programme of completion, requiring design and construction to proceed in parallel, is wanted.

2.6.3.1 Construction management procurement system

Construction management (CM) is a non-traditional procurement method that became popular during the past two decades. A design contractor acts as the consultant to the client and provides advice on constructability, construction planning, cost control, coordination, and supervision of entities. In the CM method, all subcontractors directly contracts with a client (Ruparatna & Hawage, 2015). According to Walker and Hampson (2008), CM results in more balanced power and positively influences the relationship between the client and contractor. The following are the characteristics of construction management identified by Masterman (2002),

- The construction manager is appointed as a consultant during the initial stages of the project and has equal status to the members of the design teams.
- Reimbursement is made by means of a lump sum or percentage fee for management services.

- The physical construction of the project is carried out by works, or package, contractors who are employed by the client and co-ordinated, supervised and administered by the construction manager.

2.6.3.2 Management contracting procurement system

Management contracting is a different method of procurement, where the contractors enter into a contract with the management contractor, who acts as the agent of the client (Donohoe and Brooks 2007 cited Ruparathna et al, 2015) At the initial stage project owner or construction administration provide a team of project management expertise. This procurement system is a fast track procurement option which overlaps the design and the construction stages. The management contractor employs and manages works contractors who carry out the actual construction of the project and the contractor is reimbursed by means of a fee for the management services and payment of the actual prime cost of the construction. Moreover, the management contractor is engaged to manage the overall contract in return for a fee (Masterman, 2002). Moreover, the management contractor is engaged to manage the overall contract in return for a fee. The management contractor can therefore be appointed early in the design and can advise on buildability and programming. In addition to the contract with the management contractor, the contracts for the individual work packages are between the management contractor and the individual sub-contractors (Onasakponome et al., 2011). This procurement system is fast track procurement option which overlaps the design and the construction stages (Masterman, 2002).

2.6.4 Collaborative systems

As implied by the name, the discretionary procurement systems are the ones in which the client should have the discretion to use any system from the other categories, either singly or in combination for its project management purposes (Kelvin, 2010). Two or more parties try to achieve project objective success through fair dealings, commitment and shared investment in this collaborative system (Bagnall *et al*., 1999). However, there is a general trend that a more collaborative

relationship between participating parties is involved in this procurement system (Kelvin, 2010).Furthermore, author said, this is suitable for,

- Typically used on larger and more complex projects where there is a large amount of uncertainty as the size and duration of the project has to justify the investment in setting it up both commercially and culturally
- The participating organizations need to develop and nurture a culture of collaboration throughout the system beforehand in order to manage such projects

2.6.4.1 Partnering

Ruparathna and Hewage (2015) stated that, according to the literature, partnering in construction procurement is a structured management approach that enables teamwork, trust, long-term commitment, open culture, mutual objectives, customer focus, and innovation between contractual parties. Hackett et al. (2008), also described partnering as a structured management approach which facilitates team working across contractual boundaries by integrating the project team and smoothing the supply chain. According to Bennett and Jayes (1998) Partnering is a set of strategic actions that deliver vast improvements in construction performance. It is driven by a clear understanding of mutual objective and cooperative decision-making by a number of firms who are all focused on using feedback to continuously improve their joint performance.

The three fundamental characteristic of partnering are,

- Formalized mutual objectives (which may be binding or non-binding) of improved performance and reduced cost
- The active search for continues measurable improvement, which has perhaps measured against industry key performance indicators.
- An agreed common approach to problem resolution. Hackett *et al*. (2008),

In partnering, it requires that the parties work together in an open and trusting relationship based on mutual objectives, an agreed method of problem resolution and an active search for continuous measurable improvements. And also it is a management approach used by two or more organizations to achieve specific business objectives by maximizing the effectiveness of each participant's resources (Masterman, 2002). Under those arrangements, and indeed under partnering, one team may "sink or swim" without necessarily affecting the business position of other teams. One team may make profits from a project while others may actually make a financial loss (Walker *et al*., 2000). There are two main types of partnering as Project partnering, which refers to a cooperative arrangement in a single project, and strategic partnering, which is a long-term alliance arrangement. Project partnering focuses on project performance and looks for short-term benefits (Cheng and Li 2002). Strategic partnering, on the contrary, emphasizes the establishment of long-term relationships and the achievement of strategic goals (Cheng and Li, 2002) According to Chan,A.,Chan,D. & Ho (2003) both types of partnering arrangements can bring about advantages regarding quality, sustainability, dispute resolution, human resource management, innovation, and time and cost reductions.

2.6.4.2 Joint venture

Two or more persons engaged in a single defined project in the Joint venture type project. Nowadays, joint venture become a common form of business in the construction industry, which is generally adopted by the contractors of large construction projects worldwide because it can enhance their competitiveness by pooling construction resources (e.g., capital, equipment, and expertise) from the partners as well as allocating risk among the partners (Likhitruangsil *et al*., 2008).

Further Likhitruangsil *et al*., (2008) identified that, it is normally mandatory by public owners of large infrastructure projects for bidding contractors to be established in this business form.

There is no significant change shown in its growth according to research of Rameezdeen and Ratnasabapathy (2006). And also, the traditional procurement system remains widely procuring method and it seems to be strong.

2.7 Procurement Arrangement selection

According to Nauom and Egbu (2015), it is accepted of construction management that a project may be regarded as successful if the building is completed as scheduled, within budget and quality standards as well as achieving a high level of client satisfaction and increasingly, the fulfillment of these criteria has been associated with the problem of procurement method for construction. Based on the first survey conducted by the Chartered Institute of Building (CIOB) into procurement in the construction sector, a major finding from the report indicates that 87% of respondents belief that good procurement is synonymous with a successful project. According to Ashworth (2002), selecting the most appropriate organization for design and construction work represents a fundamental aspect of the modern building "procurement" process. However, Kumaraswamy and Dissanayaka (2001) stated that it appears that decisions to use any of the available `alternative' approaches to procuring construction services are often subjective. Nauom and Egbu (2015) stated that over the years the selection process has become increasingly complex, mainly as a result of the continuing proliferation of different methods of procuring building projects, the projects' ever-increasing technical complexity and the client's need for a more value for money projects. It is therefore, imperative to say that the classic criteria of time, cost and quality alone are now too simplistic in the context of today's complex construction project environment and the decision charts need updating. Further, Ruparathna and Hewage (2015) stated that procurement criteria are moving from the traditional emphasis on quality and price of the product to increasingly address secondary environmental and social objectives.

According to Smith, Zheng, Peter, Love and Edwards (2004), selecting an appropriate procurement path is a complex and daunting task for both the client and the client's advisers (particularly client strategic facilities managers) and remains an enigma for many researchers. Nahapiet and Nahapiet (1985) found the main factors affecting choice of procurement method to be the characteristics of the client together with the project characteristics and requirements, suggesting that similar clients with similar project requirements may have similar and consistent priority ratings. Further, a list of

predominant procurement selection parameters have been identified by the Luu, Thomas and Chen (2003, p.211) under the categories of client characteristics and objectives, Project characteristics and external environment. These factors are further identified and illustrated as follows.

2.7.1 Client related factors

It is often recommended that the choice of procurement route should be based on the client's objectives and priorities (Turner, 1997). The client value system depends on the experience, nature of business, and background of the client. For construction works, the client value system defines the worthiness and desirability of a construction to a client (Olanrewaju and Khairuddin,2007). According to Olanrewaju et al, (2016) the worthiness and desirability is measured by different criteria including function, quality, aesthetic, time, safety, reliability, time, capital cost, operating cost, sustainability, resale or rental value, flexibility, comfort, community, esteem, and politics. Studies of Joseph and Jayasena (2008) point out the lack of clients' knowledge related to alternative procurement systems. Further, the researcher stated that it is difficult for the clients to gain knowledge regarding new procurement system, since most of the construction clients are laymen and any institutes or contractors do not conduct awareness programmes for clients in order to educate them regarding the innovative procurement systems.

Further, author added, therefore, the clients do not intend to use alternative procurement systems other than the traditional system. Clients are overemphasized on fee rather than services, ultimately they get poor consultants services for their projects by consider low cost. Ultimately, they provide insufficient project brief, provide inadequate time to prepare proposals to contractor, often change their scope of work, create lot of difficulties in the construction stage especially in quality control and creates conflict with contractors.

According to Rameezdeen and Ratnasabapathy, (2006) and Acharya, Lee and Im (2006) there are basic points when consider about client and client's requirements, as

Risk Management, Time availability and predictability, Price certainty, Price competition, Accountability, Flexibility and parties involvement, Familiarity.

As mentioned in the Table 2.2, most of the researchers considered following factors as major client requirements. Considering these factors help to manage project in proper way through minimizing conflict which can be arrived from client side in future.

Table 2-2: Summary of clients' requirements for a construction project

Clients Need	Descriptions	Authors
Speed	Speedy procurement process, e.g. a desire to have the project Completed as soon as possible.	Bennett and Flanagan (1983),NEDO (1985) Skitmore and Marsden (1988),Singh (1990)
Cost Certainty	Price and the stipulated time and knowledge of how much the client has to pay at each period during the construction phase.	Hewitt (1985),NEDO (1985),Skitmore and Marsden (1988),Singh (1990),Masterman and duff (1994)
Time Certainty	Degree of certainty that the project will be completed on the date, which is agreed when singing contract.	Hewitt (1985),NEDO (1985),Skitmore and Marsden (1988),Singh (1990),Masterman and duff (1994)
Flexibility	Ability to accommodate design changes during both design and construction periods.	Bennett and Flanagan (1983) Hewitt (1985) NEDO (1985) Skitmore and Marsden (1988) Singh (1990)

Responsibility	An involvement in, and a need to be kept informed about, the project throughout its life.	Bennett and Flanagan (1983) Hewitt (1985) NEDO (1985) Skitmore and Marsden (1988) Singh (1990)
Complexity	Client may specify innovative design/ high technology building and require particular subcontractor, or constructability analysis.	Masterman and duff (1994) Bennett and Flanagan (1983) NEDO (1985) Skitmore and Marsden (1988) Singh (1990)
Quality Level	Contractor's reputation, aesthetics and confidence in design. A building which reflect the client's activities and image.	Bennett and Flanagan (1983) NEDO (1985) Skitmore and Marsden (1988) Singh (1990)
Risk allocation/ avoidance	A wish to identify risks and uncertainties during the procuring process.	Bennett and Flanagan (1983) NEDO (1985) Skitmore and Marsden (1988) Singh (1990)
Price competition	Covering such issue as value for money, maintenance, costs and competitive tendering.	Bennett and Flanagan (1983) NEDO (1985) Skitmore and Marsden (1988) Singh (1990) Masterman and duff (1994)
Disputes and arbitration		NEDO (1985) Skitmore and Marsden (1988) Singh (1990)
Accountability & Transparency		Luu (2000)

(Source: Chen et al. 2002, p.287 cited Jayasena,2009)

2.7.1 Project characteristic

Each construction projects contains its' own unique characteristics. Therefore every project is different from one another. Due to these unique characteristics most of the researchers have emphasized that project characteristic should be considered in procurement selection. (Alhazmi and McCaffer 2000, Chen et al., 2003). The rationale behind this approach is that different projects will have varying degree of complexity.According to Griffiths (1999) Procurement arrangement should be depending on project characteristics, because of goals and sources are varying from project to project. There are main factors invited by Rameezdeen and Ratnasabapathy, (2006) and Acharya *et al.,* (2006) in their research,

- Project cost and funding methods
- Project flexibility
- Project type
- Time constrains
- Degree of flexibility
- Payment modality

According to characteristics of the project, change its involved parties and resources. Hence through consider above these project characteristics can forecast risk in future at the planning stage of the project.

2.7.2 External Environmental Characteristic

Selection of a procurement system is highly depends on client requirements and project characteristics, as above stated. But all the projects are operating in the external environment. Therefore neither any project can be isolated from the external environment. Every project will receive impacts and information from the environment due to that reason. Hence, the procurement selection directly influence by the external environment factors (Jayasena, 2009). According to Rameezdeen and Ratnasabapathy (2006) and Acharya *et al*., (2006)External environment always affect in selecting procurement arrangement, and those factors can be identified as follows,

- Market competition
- Economic condition and the fiscal policy
- Technology
- Socio cultural suitability
- Regulatory environment

External environment always can be changed time to time. However, if it is possible to identify risk from environment through factors concerned in procurement selection it will help to minimize conflict in the future.

2.8 Factors considered in selecting Procurement Arrangement in the present Sri Lankan Context

The selection of the 'appropriate' procurement strategy is a prerequisite to the success or failure of a construction project (Olanrewaju et al, 2016). It was noted that by selecting an appropriate procurement strategy, uncertainties can be controlled, risk can be well managed, labor can be planned and standardized and delay, disputes, and conflicts can be minimized if not avoided (Olanrewaju et al, 2016).However, in Sri Lanka, the practice of procurement selection seems to be rather unstructured and ad hock. There is no logical and consistent approach is used to select an appropriate procurement system for a particular project. Therefore, a development and application of such approach for the selection is essential to aid the clients in selecting most appropriate procurement system (Ratnasabapathy and Rameezdeen, 2007).Further, identification of significant factors affecting the selection of procurement system and development of model for a realistic selection process is essential to the success of any type of project (Shiyamini *et al*., 2005 cited Rameezdeen and Ratnasabapathy, 2006).

Joseph and Jayasena (2008) illustrated that, D&B procurement system use as next alternative option among alternative procurement systems but, less in practice. Due to the poor relationships created by client with the consultants in private and government sector and effect of political environment in procurement selection in government sector (Joseph and Jayasena, 2008).

2.9 Important factors to be considered in selecting Procurement Arrangement to minimize Disputes in Construction Projects

The construction industry has always been criticized for its relationships, with harmful conflicts and disputes, poor collaboration and lack of customer focus and end-user involvement being prominent issues in such criticism (Vennstrom and Eriksson, 2010). The high conflict and dispute rate in construction industry will definitely affect the work progress and quality (Chain, 2003). Moreover, the dispute resolution processes are higher in time and cost consumption. Degree of occurring conflict and disputes depend on the procurement arrangement. Conflicts and disputes in construction sites affect performance of all the participants.eg owner group, design and supervision consultant team, contractors, subcontractors, suppliers, labor force (Acharya *et al*., 2006; Idoro, 2009). Different positions in team roles influence not only through roles, but also their responsibilities, tasks and communication with the client, the users, the team and other stakeholders (Sebastian, 2011). Apart from coordinating the activities of other team members, the project leader provides leadership, predicts problems and conflicts and the solutions to them, mobilizes and motivates other team members in order to ensure that project objectives are achieved (Al-Momani, 2000).

Procurement has been identified as the link between a desire by the client for a construction project and the delivery of value products to agreed standards. Thus, it is an arrangement which define contractual processes, funding patterns, risk allocation, work structure and relationship amongst parties on a project (Ayopo, Ohis & wellington, 2016). There are various construction procurement methods which hails from the need to develop strategies that will meet the clients need in different circumstances. These requirement varies from the level of client's involvement, management of risks, funding arrangements, payment regimes, type of contracts to be used, the contractor's financial commitment and who are the Clients (Rwelamila, 2010). Procurement arrangement highlights the construction client's key position to affect the outcome of the construction project through proper choice of procurement methods and management processes. Further, it decides the degree to which the

involvement of client to resolve conflicts or disputes is possible (Vennstrom and Eriksson, 2010). Degree of involvement and degree of power to action taken of shareholders depend on structure (De Blois, Herazo, Latunova & Lizarralde, 2010).

All the activities of a project will be carried out according the selected procurement system of that project (Maizon, Melissa, Ng, Shim, & Tay, 2006). Therefore the procurement system will be a subject to create disputes between stake holders according to the prevailing circumstances. Except in non- traditional procurement where participants on the construction projects can sometimes be under a single organization, the organizations for procuring the project are the client, contractor and consultants who are different commercial or professional entities. Even in the non-traditional procurement method, where the project participants can be in the same organizations, the interactions on the project can lead to conflicts **(**Dada, 2012) According to Cheung, Suen and Cheung. (2003) Since traditional procurement procedures and contracts offer little incentive for cooperation to emerge, they are potential root causes of the lack of trust and cooperation that characterises client-contractor relationships. Hence, procurement is a key improvement area (Latham 1994) and a key factor contributing to project success (Cheung, Lam,Leung & Wan. 2001). Hasanzadeh, Esmaeili and Nasrollahi (2018) stated that as far as disputes are concerned, DBB is known to lead to adversarial rela-tionships among project participants due to sequential processing, fragmented relationships, and separate goals and interests among project stakeholders. Sequential processing prevents contractors from providing input during the design phase, which leads to potential change orders later on. In addition, because the designer and contractor contract with the owner as separate entities, they have different and sometimes contradictory goals and interests, which may lead to disputes. Studying procurement methods in use by private , public and local authority clients in the UK, the authors found that projects which utilized the traditional procurement method experienced higher conflicts in budget and payment issues, performance issues, delay and time related matters and in negligence (Conlin, Langford, & Kennedy, 1996).

In recent years increasing interest in cooperative relationships, such as partnering, has been noticeable in the construction industry as a result of escalating conflicts and adversarial relationships in many countries (Chan, Chan & Ho. 2003). However, there seem to be barriers in terms of widespread adoption of modern techniques when considering the procurement route for a project. This is partly due to associated risks and attitude towards change. In order for the construction industry to be able to meet the managerial, technical and social challenges, both the industry and its participants have to welcome 'change' and allow innovative procurement methods to grow (Naoum and Egbu, 2015). As noted by Ruparathna and Hewage (2015) and indeed by many well-known academic journals, this change needs to be a client-driven process supported by the rest of the building team.

2.10 **Summary**

Through this literature review certain objectives of this research were successfully achieved. At the earliest steps of this chapter disputes in construction industry was identified, together how it is occurred and the consequences when each situation is managed and when it is not managed is discussed in detail. Then at the next step, procurement arrangement in the industry was identified and usage of each arrangement is discussed as synthesized in the literature. Current situation of selection of procurement arrangement in Sri Lanka is also discussed within the literature. Further, the researcher revealed that relationship between disputes and procurement arrangements. Finally, in order to proceed with the research, the researcher is looking forward to illustrate on the research method from the following chapter.

3.0 RESEARCH METHODOLOGY

3.1 Introduction

Research methodology is the plan which shows the path effectively reach to conclusion achieving research problem. It deals with the logic scientific inquiry, strategy for testing the hypothesis or in interpretive work to understanding the phenomenon (Tan, 2002). Therefore, this chapter explains the procedure adapted to the research while establishing a theoretical background of the area of study. Moreover, this chapter presents research design, data collection method, and data analysis method.

3.2 Research process

The aim of this research is to provide suggestions to minimize disputes in different procurement arrangements. Accordingly, the following process indicates in figure 3.1 will be adopted to achieve the research aim.

Figure 3.1, indicates the process of this research including the identification of research problem, literature review, research design (case study), data collection methods, data analysis, conclusion and recommendation.

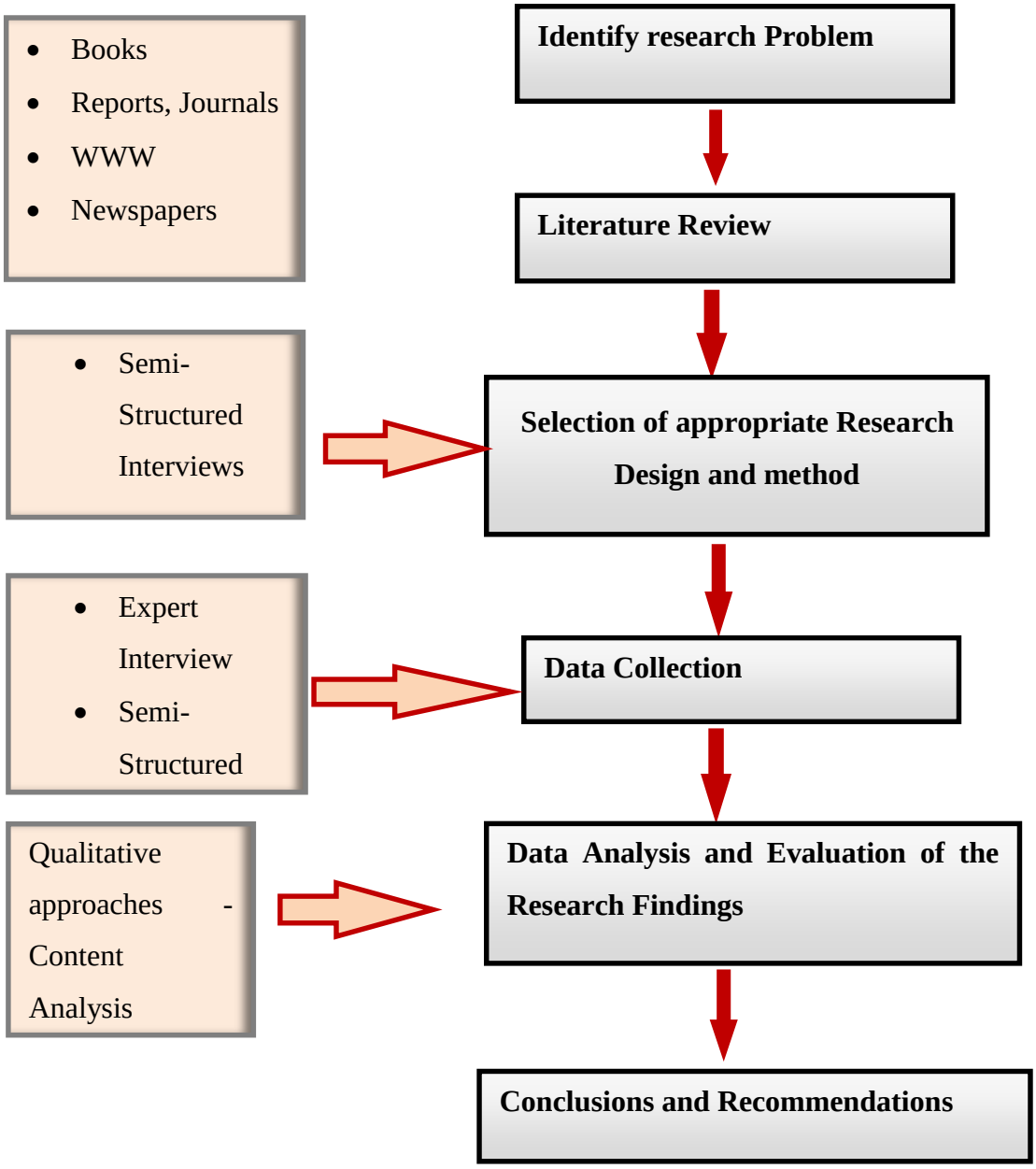

Figure 3-1: Reach Process

3.2.2 Literature Review

Related literature or researches, are important to commence all new researches and to determine whether any data resource already exists that can be brought to bear on the problem at hand. Hence, a comprehensive literature survey was carried out on disputes arising out of different procurement arrangements through books, journals, reports and World Wide Web.

3.2.3 Research Approaches

An appropriate research approach had to be designated to deal with the research problem. According to Easter by Smith et al. (2002), the research approaches support to establish research activities, including the collection of data, in ways that are aimed to achieve research objectives.

Affording to most writers as Yin (2009), Rudestam and Newton (2007) and Flick (2006) research approaches can be mainly divided as qualitative and quantitative approaches. Same researchers further categorized quantitative approaches as Surveys and Experiments while qualitative approaches as Case studies, Ethnography, Action Research and Ground theory.

Patton and Appelbaum (2003) mentioned that case studies are more suited for the studies where qualitative data predominate. Lee et al. (2007) discussed the importance of usage of case study research approach in unique cases which has qualitative tradition and came across as management researches.

On the other hand, the aim of this research is to provide suggestions to minimize disputes in different procurement arrangements. Therefore, the research problem could be developed as; "How to minimize the disputes arising out of different procurement arrangements?" Yin (2009) recommended that the case study research approach is suitable for the researches which have research problems based on "how" and "why" types. Moreover, Malewana (2009) specified that the case study research approach can be very useful when very little is known about a particular phenomenon. This research

also dealt with qualitative data as generated through human interactions and behaviours. By considering all of above reasons, case study research approach was selected for the research.

3.2.3.1 Case Study Design

The purpose of the case study is to gain in depth understanding about the meaning of the subject being studied, focusing on process rather than outcome. According to Yin (2003), generalizability of the study can be increased through the design of the case study and thus, special care should be taken in the case study design. Udawaththa (2010) explained that, in case study design there are two main aspects to be considered: identification of unit of analysis and criteria for selection of cases. The case study designing procedure which is emphasized next, as the identification of unit of analysis, defining the number of cases and criteria for selection of cases.

Identification of unit of analysis

Identification of 'unit of analysis' or the 'case' is of primary standing to any research design which is connected with the mode of research problem created (Yin, 2009). Aim of this research is to provide suggestions to minimize disputes in different procurement arrangements addressing on research problem as "How to minimize the disputes arising out of different procurement arrangements?" Therefore, the unit of analysis or case in this research is the Disputes as illustrated in below Figure 3.2.

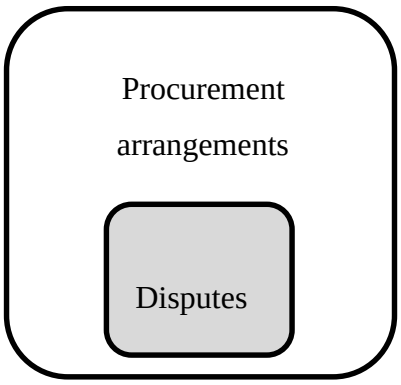

Figure 3-2 : Unit of analysis

With the identification of the unit of analysis for this research as Disputes, next section discusses about the identification of the number of case studies.

Defining number of cases

It is important to define the number of cases when the research is designed from the case study approach. The number of cases in case study could vary from one to eight according to the nature of the research (Yin, 2009). According to Perry (1998), when the study area is too broad in a qualitative research, it is advisable to use only one or two and utmost four cases. Fong (2005) mentioned that multiple case studies facilitate the researcher to explore differences within and between cases. Accordingly, multiple case studies with four cases (two cases for each procurement arrangement) were selected for the research while giving consideration to the time constraints prevailing on the study. The next section describes the criteria used for selecting the cases.

Criteria for selection of cases

Yin (2009) argued that the criteria for selecting cases is a matter of discretion and judgment, convenience, access and to be those which are subjective for the purpose of the research. In advance moving to the empirical study, details of four cases (two cases for each procurement arrangement) were gathered through a pilot study.

After having the explanation on case study designing stage, the data collection stage is describes in the next section.

3.2.4 Data collection

According to most authors (Yin,2009; Weinberg, 2002; Gilliam, 2005; Neergaard and Uihoi, 2007; Travers, 2001) have explained about interviews and observation as suitable data collection tools for case study researches. Among that interviews will be used as the main data collection instrument as, it is the most reachable and affordable method when considering the circumstances which the research had to be carried out.

Yin (2003, p.92) stated that, interviews are an essential sources of case study evidence because most case studies are about human affairs and these human affairs should be

reported and interpreted through the eyes of specific interviewees. Sekaran (2003) stated that, when interviews are conducted in semi-structured manner, it supports to adapt the questions required, clarify doubts and ensure that the response is properly understood by repeating and rephrasing the questions. He further stressed that, if the interviews are carried out face-to-face manner, researcher can pick up the nonverbal indications from the respondent and it is advantageous to understand the response effectively and evaluate whether the respondent's mental condition is suitable to answer the question clearly. Hence, the interviews were carried out face-to-face in semi structured manner. The structure of the interview and the interview process are explained in next section.

3.2.4.1 Semi-structured Interviews

The interview structure was developed by using the interview guidelines and these guidelines were formed to capture data around the research problem. Hence, these guidelines were established with reference to the literature synthesis and objectives of the study.

Interview Process

In the best interests of this research semi-structured interview had conducted with industry experts who are involved in the selected cases. Interviewees were selected from the top or middle management who involved as a contract part of selected cases. Altogether, 12 interviews were conducted (three from one case) according below Table 3.1 and for each interview normally within 40 to 50 minutes.

Table 3-1: Interview description of the Cases

Cases	Procurement arrangement	Interviewees	Profession	Experience (yrs)
A	D&B	A1	Civil Engineering	21
		A2	Quantity Surveying	15
		A3	Civil Engineering	20
B	D&B	B1	Civil Engineering	21
		B2	Quantity Surveying	18
		B3	Civil Engineering	15
C	Traditional	C1	Quantity Surveying	25
		C2	Quantity Surveying	20
		C3	Quantity Surveying	17
D	Traditional	D1	Civil Engineering	25
		D2	Civil Engineering	20
		D3	Quantity Surveying	17

The interviews were tape-recorded (with permission of the interviewee) to avoid losing data since everything cannot be written down during the interview. Finally, interview transcripts were developed. However, the actual names of the cases and the interviewees were not revealed in this report to maintain confidentiality. The next section describes the data analyzing process of collected data.

3.2.5 Data analysis

Even though Yin (2009) has come up with several techniques to analysis qualitative data namely pattern matching, explanation building, time series analysis, logic models and cross case analysis the technique had approached to this research was cross case analysis. Hence, Perry (1998) emphasized that these findings should be justified by

using 'cross-case analysis' which is the process in identifying interrelationships and differences between each case and afterwards, the conclusions should be made.

In this research, detailed write-ups were made by analyzing the patterns (interrelationships) of cases. Content analysis was used in this research to analyze data and to identify the patterns of cases and these are discussed next in subsequent sections.

Conclusion drawing is the final stage of data analysis. The findings from the empirical study; their interrelationship with existing literature; and, the propositions from this study to both the theory and to the practice were emphasised under conclusions. Further, new research directions that appeared from this research were also illustrated in the conclusions.

3.2.5.1 Content Analysis (Write-up)

Even though the writing up is given as the final stage of the dissertation, this is being gradually done throughout the research process in sequential manner. The write-up was started in an explanatory manner in the early stages and narrowed down towards the latter stages.

By using the findings from the literature review as the basis, major themes and sub themes were formulated were developed accordingly. Then, all data of interview transcripts were categorized.

The next section is dedicated for validity and reliability of qualitative research, which leads to enhance quality of a research.

3.2.5.4 Validity and Reliability in Research Study

Any method of study is inadequate without considering the basic issues relating to review of the validity of any research outcomes (Malewana, 2009). Yin (2003) explained that, to confirm the validity of a research study and to pass certain design tests with regards to diverse levels of research validity, as explained below.

Furthermore, measures which were taken to ensure the validity and reliability of this research under each of above facts of validity are also specified in the Table 3.2.

Table 3-2: Measures taken to ensure validity and Reliability

Construct Validity	Establishing correct operational measures for the concepts being studied.	• Semi-structured interviews with three industry experts on the unit of analysis • Conducting semi-structured face-to-face interviews while adapting the questions necessary, clarify doubts, picking up the nonverbal indications from the respondent to greater understanding.
Internal Validity	Establishing casual relationships, whereby certain conditions are shown to lead the other conditions, as distinguishes from spurious relationships	• Developing the research problem in a reasonable manner based on a comprehensive literature review • Pattern matching during cross case analysis
External Validity	Establishing a domain to which study's findings can be generalized	• Selecting three cases to investigate the problem • Adapting reasonable criteria for selecting cases
Reliability	Demonstrating that the operations of a study such as data collection procedures can be repeated with the same results	• Tape recording and note-taking during interview and developing interview transcripts to avoid losing • From every case, all the partners of Contractor and employer's representative were interviewed.

3.3 Summary

Effectiveness of a research study depends on the selection of proper methodology; therefore this chapter has presented the research design and data analysis procedures. This research contains multiple case study research to study about disputes in different procurement arrangements and the unit of analysis of the study is 'Disputes'. Four number of cases were selected for the study, based on access and time limitations. Semi-structured interviews were carried out with stake holders who involve in variation disputes as the primary data collection tool. Finally, the data was analyzed by appropriate methods (content analysis and mapping technique) regarding qualitative approaches. The next chapter describes research findings of this study.

4.0 RESEARCH FINDINGS

4.1 Introduction

Research methodology used for this research study was discussed in chapter three. Then the aim of this chapter is to illuminate the research findings of the empirical investigation. Initially, a brief introduction to the selected cases has given as to provide an understanding on the background of each case. Then, within case analysis has been carried out to identify the conflict within case according to interviewee's knowledge and idea. This was followed by cross case analysis to scrutinize the similarities and differences between each project separately and discussed between Design and Build project and Traditional procurement arrangement. Latter parts of the analysis present findings of Design and Build arrangement and Traditional procurement arrangement and both in commonly.

4.2 Case Study Analysis

The empirical study was carried out on projects executed with two different procurement methods. Two projects were selected under traditional procurement method and two projects were selected under Design & Build method. A brief description to selected four projects are given in below Table 4.1.

Table 4-1: Brief Introduction to selected Projects

Case	Procurement Method	Type of Project	Contract Sum (Mn)	Duration (Months)
Case A	Design & Build	Building	1,800.00	24
Case B	Design & Build	Hospital Building	1,200.00	18
Case C	Traditional	12 storied Building	900.00	15
Case D	Traditional	Hotel Building	2,500.00	30

4.2.1 Design and Build procurement Arrangement

4.2.1.1 Case A

Background of the Case

The project which researcher had analyzed was a Building Project which was delivered through integrated arrangement. More precisely it is a design and built project. So according to the most of the literature review risks are shifted to the Contractor. The estimated project amount was Rs.1800Mn. The client of the project was a government Organization. The Contractor has selected through negotiation.

At the beginning of the procurement client had produce a document which briefly explained the client`s needs of the project. However it only consists of two pages.

Analysis of the Case

Three people were interviewed when analyzing the case. Interviewees has consist of Project Manager, Design Engineer and Quantity Surveyor. The interviewees had clear idea of the project since all the interviewees joined the project from initial stages of the project itself.

According to the interviewees there were many conflicts and disputes occurred during the design stage as well as construction stage. Due to the conflict situations there were Payment delays and variations which leads to time and cost overrun of the project.

According to the Contractor Quantity Surveyor of the project, there were many conflicts in the design stage as well as in the construction stage of the project. Design Engineer also was given a similar kind of opinion regarding the conflicts in design and construction stages. As they mentioned, at the preliminary design stage *client had not expressed the whole idea of the project*. Client has just produce a document with two pages as the Client requirement and Contractor has designed the project accordingly. This leads to major disputes in the project, because due to the vague Client requirement

it was difficult to identify the Original Client scope and the varied scope. When approving the variations Client Quantity Surveyor argued that Contractor is not entitled for variations as it is already in the Client`s original scope and this leads to many disputed variations, Further, according to the Design Engineer of the project there was very *lacking coordination between parties during the design stage of the project*. There was no any party appointed for coordinating the project. If the client has appointed a project coordination team it could be helpful for the design development of the early stage of the project. Project quantity surveyor further emphasis that there is a *very limited time period for tender*. The original knowledge of the Client's Requirement at the tender stage is very essential during the tender to identify the risks or opportunities. According to the ideas of the Quantity Surveyor more realistic tender period is worthwhile when consider about the project performance.

According to the Design Engineer of the *project lack of knowledge of the client about construction methodology and construction drawings leads to more conflicts*. Further he mentioned that client have not involved in this kind of project previously. Therefore *client had not clear idea about the project until it physically visible*. As Design Engineer of the design team mentioned, *client has changed the initial requirement of the project time to time* and it leads to conflicts of the project. *Design changes* occur in line with the change in Client`s requirements. These design changes leads to payment delays, deduction of payment.

Since this is a Design and Build Project the payment method was lump-sum and BOQ was a very brief one. The Client`s quantity Surveyor was not that much aware of the Project and limitations of the BOQ therefore it leads to inadequate payments.

According to the Project Quantity Surveyor, *Inadequate client requirement, lack of design management, and site management* leads to conflicts in the project. According to the Design Engineer of the project if client *has appointed a coordination team among client and the contractor many conflicts arising out of design can be reduced*. As above mentioned at the tender stage if contractor paid more attention to the Client`s brief more internal variations can be minimized.

Project Manager mentioned that successful completion of this kind of project need good team work. If Client was more supportive to the work rather than giving full responsibility to the Contractor disputes may reduce in the project. He further mentioned that even though the design responsibility was with the Contractor, it was Client`s responsibility to express his requirement more clearly at the beginning of the project. Client should take decisions at the design stage with proper planning. In addition to that the project manager mentioned, Improve project participant's knowledge regarding procurement methods is important to successful completion of the projects. Furthermore *Lack of experience* of the contractor to the Design and Build Approach also an issue. According to the Architect Employer`s representative is more favourable to the Employer. This behavioural trait also lead to conflicts in the project. Moreover, lack of attention to the Client`s brief at the tender stage can be consider as a *negligence* from the contractor.

4.2.1.2 Case B

Case Background

This is a hospital project which was delivered through Design and Build procurement method. The client was a government Institution. The Contractor has selected through negotiation. The project has carried out in two phases. The first phase of the project consist of two storied building with surgery unit. Three persons were interviewed. Project Manager and Design Engineer from the Contractor`s side and Client Quantity Surveyor of the Building. Project Manager has involved with the project since inception of the project.

Analysis of the Case

Two storied building was expanded for four or five stories building later. It was the other step of the design. The Contractor has good reputation in the industry as a design & build contractor. At the initial stage building concept developed through meetings. Project Manager mentioned that design team had consist of experienced professionals with special knowledge for designing hospitals. However, those professionals had not

knowledge regarding medical functioning. According to the Contractor`s Project Manager there were many conflicts in the project. The main reasons for those conflicts were *client`s lack of knowledge regarding construction, change of the directors in the hospital*, Errors in contractor selection procedure. As illustrated by the Project Manager at the early stages of the construction client had not clear idea about the project. At the mid of the construction stage only client get an idea about the project. Change of directors also caused many conflicts to the project. After seen the actual space the second director instructed to construct a two surgery bed. This leads to changes to the Air conditioning, lighting system and other functional connections. Even though there were variations to the original scope of the project client has *refused the claim for variations*. This leads to a dispute situation.

In the painting item also there were many conflicts raised The second director instructed to change the Colors of the Building. However, as per the contractor the colors selected at the *designing stage were* most suitable colors according to the function. However the priority was given to the client's ideas and requirements. According to the Project manager of the project there were conflicts in arrangement after the construction. However those conflicts disregarded due to increase of the agreed contract sum.

The current user of the building was not satisfy with the design of the project. According to the interviewee there are many errors and fault with the design of the project such as insufficient space, problems in space arrangement. Further, there is no sufficient space to do its functional works such as examine patients in the correct manner due to misused space at corridors. Moreover, not having any entrance corridor at the rear side of the building is totally misused.

Due to the misused space, most of the functions of the building were made difficult. This misuse of space affected the dressing room which does not have sufficient space and also for storage rooms, toilet area selection and also for other functional works like cloth ironing, dining room for staff and staff waiting rooms. When probing about knowledge about drawings from client QS of the building it was stated that

there were lack of idea about scale between drawing dimension and actual dimension of the work.

Moreover that client illuminated that, if there were a representation of a person in the construction team who has a good knowledge and experience about hospital functioning and construction in the contractor's party, the project would have been finished in a good manner in quality than the present. Further, that kind of a representation is needed in contractor's design team. At least if the contractor has hired an experienced medical officer to support to project design and the construction there would be more success. Due to those design faults it was necessary to state that the project is not up to the standard as expected.

Contractor's party said that cost overruns & time overrun has incurred since much more priority was given to the client's requirement with the changes of the design time to time with the changes of directors.

Comparing the selected cases A and B, Conflicts identified in D&B approach (which are the cause of disputes) through the interviews can be summarized as follows,

Conflicts in D&B procurement arrangement	**Interviewee Reference**					
	Case A			**Case B**		
	A1	A2	A3	B1	B2	B3
Client brief is not clear at the beginning	√	√	√	√	√	√
lacking coordination between parties during the design stage	√	√	√	√	√	√
lack of knowledge of the client about construction methodology and construction drawings	√	√	√	√	√	√
client has changed the initial requirement of the project time to time	√	√	√	√	√	√

Client`s quantity Surveyor was not that much aware of the Project and limitations of the BOQ	√	√	√			
lack of design management, and site management				√	√	
coordination team among client and the contractor	√	√	√	√	√	√
Lack of experience of the contractor to the Design and Build Approach	√	√	√			
client`s lack of knowledge regarding construction	√	√	√	√	√	√
client has refused the claim for variations				√	√	

4.2.2 Traditional Procurement Arrangement project

4.2.2.1 Case C

Case Background

The project was a 12 storied Building which was delivered through Traditional procurement system. That means, Client, consultant, architect and contractor were separate parties for this project. The Contractor to the project was selected through the Competitive Bidding Procedure while Consultant and architect were selected by using negotiation.

Discussion and analysis

Interviews were conducted with consultant's QS, contractor's QS and client's QS. All QSs have involved since the early stages of the project. According to the Contractor`s QS, at the beginning of the project there were delay in the submission of the Drawings by the client to the Local Authorities for the approval. At that time client has given the Access to the Site to the Subcontractor. However, due to the pending approval from the local authorities Contractor unable to commence the Excavation work for the Raft foundation. Because Contractor should get approval from the GSMB for the excavation for commence the work. This situation leads to delay in the Construction.

According to consultant QS, most of design conflicts and construction conflicts raised because of the temporary type BOQ, which was based on preliminary drawing. Meanwhile the construction, client needed to do some changes in the design which was expanding the project scope. However, when the contractor asked for the claims for those variations client was not interested about the claims because of the issues that they had about the budget. More over according to QS's of both client's and consultants, this project will be delayed on scheduled time of completion with all those change in the design. It was predicted that contractor is performing in good consistent manner and continuing the work most of the time without the client's approval for the variation which are taking place. The other aspect is that the design consultant has developed the design right up to the start of the construction to give

best product for client without considering client's budget. According to consultant QS designing right up to the start of the construction also caused some conflict specially when controlling the design team.

When interviewing the client's QS about those conflicts, client's QS said that, client has already requested those design changes on the meeting that they had to discuss about designs and the contractor's party agreed for those changes on those early design meetings. Further, it was informed to the consultant that it should control project within client's budget specially with sheltering the project scope. *Also client's QS mentioned that there is no correct BOQ or permanent drawing for this project.* This could be a major reason behind to all conflicting situation within the project. In this project architect issued variations through consultant without acceptance of client, due to the urgency of the project. *Contractor always had an obligation to do whatever consultant requests. When the payments take place, those were not accepted by the client's party*.

According to both consultant's and contractor's QS, client party had over confidence about staff. Actually, the clients team consists with, engineers in construction and people who knows about functioning of these kinds of special building projects. *The problem was that client's team does not have an involvement of the experienced people who had a good knowledge about ongoing construction projects.* Client only had the people who had an understanding about work functioning through working in that kind of buildings.

Moreover consultant's QS pointed out that, project coordination is very weak on client's party. According to the contract the responsibility of coordinating the whole construction team was with the client's party. Further, it should have a better coordination to all civil contractors and MEP contractors to minimize the construction conflicts at the design stage. Therefore it is better to have a separate team for the purpose over a group with inexperienced people who do not have a good idea about how to handle a project.

Contractor is carrying the project forward with client's approval or with the variations which must approve in the future by the client. Further, client's party does not have a clear idea about the most of the situations. According to contractor's QS ideas, if client has used a separate team with some experience for coordination and to manage the payments, it would have been directly affect the project in an effective manner. Consultant's QS also derived the same idea about the client. Other than that the interviewee mentioned about project team structure. It was suggested a management oriented procurement arrangement would be more suitable for this kind of project.

Client's party does not seem to be aware about any fault about the duties and responsibilities. Client's QS have no any idea about advantage and disadvantage of other procurement arrangements other than design and build and traditional arrangements and less experience on handling and mitigating conflicts in the project.

As discussed above this project is delivered through traditional procurement method. Therefore risks will be shared between contractor and Employer. However regardless of the procurement arrangement there were many conflicts within the project.

4.2.2.2 Case D Change in the angle of the building

Case Background

This is a Hotel construction project. Traditional procurement arrangement method is used here. Therefore the project is comprised of separate parties for civil work consultant, cost consultant, architect, and contractor. This is an ongoing project which is still at its early construction stage and client's party represents only one.

Discussion and analysis

In this case the interviewees were the client, Project manager from the contractors party and project QS who represents the cost consultant party. All of these members have joined to the project at initial stage. According to the consultant QS, client came with own design plan for the project. Therefore, it helped to the architect, and what the architect has done was developed the plan that has been brought to the architect with giving a high priority level to the client's requirements. This also helped to solve most of the conflicts which were among through client and the architect about the design in the initial stages.

At construction stage it required certain changes of the design. Client requested to change the angle of the building, which was quiet complex process, because the change would bring the building almost near the lake. If the change was initiated as client requested bigger portion of the building will be moved to the middle of the lake. Contractor realized that change of the angle of the building will increase the complexity of the project in a high manner and it was the only option available. That was to request a claim for excavation and construction at water base and cofferdam which was not at the time included in the BOQ. However, the response of client was not at a satisfactory level. Client tended to reject the claims due to the cost limit that he could allocate was at the peak level at that time. The client needed to control the cost and to avoid the variation of the change of the angle of the building, expecting big extra claims further, in order to finish the project with in the early

allocated budget. More importantly with those changes with the design, this brought out a conflict situation for the consultant's QS.

According to consultant's QS, duty was to do the job in a fair manner for the client's party as well as for the contractor's party. However, there was a conflict situation by initiating this. Hence, client is required to achieve the required favourable necessities through the consultant. It brought out to a much more conflicting and complex situation for the consultant. Architect also had to change the overall idea and other designs about project, therefore it also caused to much more difficulty in variations in next stages.

According to Consultant QS, Client should have come with a clear idea before the construction. Especially at least in the schematic design stage the project scope should be clear. Further, client should have a pre-planned scope with a good standard and also with fewer changes. If such type of plan and a scope was available it would have been easy for all three parties who have involved in this project as well. Further, it would increase the efficiency and both quality factor to a good level and also it can be developed up to the detail design stage.

If client has used another independent party to keep records at site, it would be very useful when a conflicting situation has arisen, thus leading to fair decisions. Standard of coordination and management will be carried up to a higher level. At present the management system is considerably inadequate and if an involvement of external party was available or given management authority to be involved which could have been a great help initiate a better project. Consultant's idea on management oriented procurement arrangement was suitable for this project. However, the consultant did not point out that straight forwardly. Lack of knowledge of client regarding alternative procurement arrangement also has caused lot of problems. This is because there are less institutions and firms which are using other alternative procurement arrangements in Sri Lanka. Poor innovative procurement arrangement in project management is also a reason for the above problem.

According to contractor, client had not any idea about the difficulties to be faced with the variations and client had not much knowledge about the constructions also. Lack of knowledge about claims also led to conflicting situations.

According to client, contractor's quality of work was quite less than the considerable level as cheapest method for temporary work was used and also another problem was not managing the claims. Client was in a position that, it was the responsibility of the consultant to manage and minimize claim situations. *Further, client was only aware of the traditional and design and build procurement arrangements.* The lack of knowledge about innovative tenders, duties and responsibilities of each team members also caused to generate conflicting situation and out of control situations.

As discussed above this project is delivered through traditional procurement method. Therefore risks will be shared between contractor and Employer. However regardless of the procurement arrangement there were many conflicts within the project which affects to the performance of the project. Most of these conflicts were raised due to improper communication channel, negligence, lack of experience, Employer`s representative influence by the Employer.

Comparing the selected cases A and B, Conflicts identified in Traditional approach (which are the cause of disputes) through the interviews can be summarized as follows,

Conflicts in Traditional procurement arrangement	**Interviewee Reference**					
	Case C			**Case D**		
	C1	C2	C3	D1	D2	D3
client's team does not have an involvement of the experienced people for construction	√	√	√	√	√	√
client has used a separate team with some experience for coordination and to manage the payments	√	√	√	√	√	√
Improper communication channel	√	√	√	√	√	√

Client should have come with a clear idea before the construction	√	√	√	√	√	√
Lack of knowledge of client regarding alternative procurement arrangement	√	√	√			
client`s lack of knowledge regarding construction	√	√	√	√	√	√
client`s lack of knowledge regarding claim and variations				√	√	
Design changes by the Client	√	√	√	√	√	√

4.3 Cross Case Analysis

The cross case analysis with regard to the empirical study is carried out in this section analyzing the similarities and differences of conflicting situation across the two cases related to each of procurement arrangements. Then analysis has been carried out to compare each considered procurement arrangements.

4.3.1 Design and Build: Inter-case analysis

4.3.1.1 Causes for disputes in Sri Lankan construction industry

By in depth analysis of the Case A and Case B, causes of disputes were identified related to the Design and Build Procurement Arrangement. According to the expert opinions identified causes of disputes within the cases compared with the Causes of disputes identified in the Literature review and illustrated through Table 4-2.

There were many similarities between the two cases. Most of the interviewees identified *unclear scope definition by the Client* was a major cause for disputes. In both cases client has not express the whole idea at the beginning and this leads to incur disputes. Further, disputes were arised due to *poor communication* within the project team. There were very lacking management of the project as well as identifying representative people in all parties was difficult. There were few people who gave ideas about the requirements which should fulfil by the project *and there was no authorized person to give instructions and manage the project*. *Non appointment of whole project team at the project commencement* was also support to generate conflicts in case A.

Table 4-2: Causes of Disputes in Design & Build Procurement Arrangement

Categories of Disputes	Causes of Disputes identified in literature	Causes of Disputes Identified in Cases	
		Case "A"	Case "B"
Owner/Client related	Failure to respond in timely Manner		
	Deficient management, supervision and coordination effort on the part of the project	√	√
	Lowest price mentality in engagement of contractors and designer		
	Unrealistic client expectation and determination		
	Project scope definition not clear	√	√
	Variations initiated by the owner		
	Change of scope	√	√
	Late giving possession		
	Acceleration		
	Payment delays	√	
Contractor Related	Inadequate contractor's management, supervision and coordination	√	√
	Failure to plan and execute the changes of works		
	Failure to understand and correctly bid or price the works		
	Lack of understanding and agreement in the contract procurement	√	
	Inadequate project handling experience of contractors	√	√
	Inadequate critical path method (CPM) scheduling and updated requirements		
	Delays in work progress		
	Time extensions		
	Financial failure of the contractor		
	Technical inadequacy of the contractor		√
	Quality of works		
Consultant/ Design related	Failure to understand its responsibilities under the design team contract	√	√
	Errors or omissions resulting from uncoordinated civil, structural,		

	architectural, mechanical and electrical design		
	Design errors and omissions		√
	Inadequate /incomplete specifications		
	Quality of design		√
	Availability of information		
	late instruction from architect or Engineer		√
Contractual Matters	Ambiguities in contract document		
	different interpretations of the contract provisions		
	Risk allocation and other contractual problems		
Project related	Site conditions		
	Unforeseen changes		
Human Behavioural related	Poor communication among project team	√	√
	Poor interpersonal skills	√	√
	Opportunistic behaviour and cognitive dissonance		
	Multicultural team problem		
	Reluctant to check constructability		
	Lack of team spirit	√	√
	Adversarial or controversial culture		
	Negligence or negative attitude of Project Participants	√	√
External Factors	Weather		
	legal and economic factors		
	fragmented structure of the sector		

As illustrated in the table, Client`s lacking management, supervision and coordination effort on the part of the project, Poor scope definition, Change of scope, Payment Delays, Inadequate Contractor`s management, Supervision and coordination, Inadequate project handling experience of contractors, Failure to understand its responsibilities under the design team contract, Poor communication, Poor interpersonal skills, Lack of team spirit, Negligence or negative attitude of project participants were identified in both literature and selected two cases.

In addition to the causes of disputes identified in literature review less number of in-house design contractors, Client`s lack of knowledge, non-appointment of key personnel of project team at the beginning were also identified as a causes of dispute in selected cases.

4.3.1.2 Effects of disputes in Sri Lankan construction industry

According to the interviewers, the effects incurred due to disputes can be identified as Cost effect and time effect. The comparison between effects identified in the literature review and effects identified in cases were illustrated in Table 4-3.

Table 4-3: Effects of Disputes in Design & Build Procurement arrangement.

Effect	**Case A**	**Case B**
Cost Effect	√	√
Time Effect	√	√
Quality Effect		√
Damage Business Relationships		
Loss of Productivity		
Reduction in investment profits		
Decrease the ratings of contractors in financial prequalification evaluations		

As illustrated in the table, even though some effects of disputes were identified through literature those were not identified through cases (Damage Business Relationship, Loss of productivity, Reduction in investment profits, Decrease the ratings of contractors in financial prequalification evaluations)

4.3.1.3 Relationship between procurement system and disputes

Within the Design & Build procurement method Contractor is responsible for both design and construction of the project. Due to this characteristic of the Design & Build arrangement which transfer most of the responsibilities to the Contractor it was expected lesser disputes in the project. According to Jackson (2011), the common goal of design and Build arrangement is reducing of contractual claims. Further Songer and Molenaar (1996) identified claim reduction as advantage of a Design & Build arrangement. However as described in the 4.4.1.1 many dispute causes had identified in the Design & Build arrangement in the selected cases. In both cases it was highlighted that the inadequate scope definition, Changes in scope, inadequate communication channel, lack of Design Management, Lack of team work leads to disputes. Therefore, it implies that project participants cannot expect less disputes in Design & Build arrangements if they not put their efforts to adequate design management, complete and clear line of authority and proper communication channel within the project, team working and clear scope definition.

4.3.1.4 Suggestions to minimize the Construction disputes within different procurement arrangements

According to the Expert opinions of the interviewers following suggestions were made to minimize the disputes of Design and Build projects.

Table 4-4: Suggestions to minimize disputes in Design & Build Procurement arrangement

Suggestions to Minimize Construction Disputes	Case A	Case B
Appoint a Qualified Personnel with specialized knowledge to handle the project by Client	√	√
At design stage client should ensure proper planning and clearly reflect the Client`s requirements at the beginning	√	√
Improvement in communication channels and clear line of Authority within the project	√	√
Effective Teamwork	√	√

Improve Positive attitude of Project Managers to all issues	√	√
Training of project managers to acquire essential skills	√	√
Improve project participants Knowledge regarding procurement method	√	√
Provide clear understanding of the contract to the site managers	√	√
Implementation of a design management team early in the project by Contractor	√	
All Key personnel of the team should be appointed at the project commencement	√	√
Involve all the potential site team during the tender period	√	

4.3.2 Traditional arrangement: Inter-case analysis

4.3.2.1 Causes for disputes in Sri Lankan construction industry

In depth analysis of the Case C and Case D, causes of disputes were identified related to the Traditional Procurement Arrangement. Identified causes of disputes within the cases compared with the Causes of disputes identified in the Literature review and illustrated through Table 4-5.

Table 4-5: Causes of disputes in traditional procurement arrangement

Categories of Disputes	**Causes of Disputes identified in literature**	**Causes of Disputes Identified in Cases**	
		Case "C"	**Case "D"**
Owner/Client related	Failure to respond in timely Manner		√
	Deficient management, supervision and coordination effort on the part of the project	√	√
	Lowest price mentality in engagement of contractors and designer		
	Unrealistic client expectation and determination		
	Project scope definition not clear		

	Variations initiated by the owner	√	√
	Change of scope	√	
	Late giving possession		
	Acceleration		
	Payment delays	√	√
Contractor Related	Inadequate contractor's management, supervision and coordination		
	Failure to plan and execute the changes of works		
	Failure to understand and correctly bid or price the works		
	Lack of understanding and agreement in the contract procurement		
	Inadequate project handling experience of contractors		
	Inadequate critical path method (CPM) scheduling and updated requirements		
	Delays in work progress		√
	Time extensions		
	Financial failure of the contractor		
	Technical inadequacy of the contractor		
	Quality of works		
Consultant/Design related	Failure to understand its responsibilities under the design team contract	√	
	Errors or omissions resulting from uncoordinated civil, structural, architectural, mechanical and electrical design		√
	Design errors and omissions	√	√
	Inadequate /incomplete specifications		
	Quality of design		
	Availability of information		
	late instruction from architect or Engineer		
Contractual Matters	Ambiguities in contract document	√	
	different interpretations of the contract provisions		
	Risk allocation and other contractual problems		
	Site conditions		

Project related	Unforeseen changes		
Human Behavioural related	Poor communication among project team	√	√
	Poor interpersonal skills		
	Opportunistic behaviour and cognitive dissonance		
	Multicultural team problem		
	Reluctant to check constructability		
	Lack of team spirit	√	√
	Adversarial or controversial culture	√	√
	Negligence or negative attitude of Project Participants		√
External Factors	Weather		
	legal and economic factors		
	fragmented structure of the sector		

As illustrated in the table, Client`s deficient management, supervision and coordination effort on the part of the project, Variations initiated by the owner, Payment Delays, Poor communication, Lack of team spirit, inadequate contract documentation, Design errors were common causes among two cases. Apart from that improper variation procedure leads to disputes in traditional procurement arrangement.

4.3.2.2 Effects of disputes in Sri Lankan construction industry

According to the Expert opinions the effects of disputes in Traditional Procurement methods were illustrated in the Table 4-6

Table 4-6: Effects of disputes in Traditional Procurement arrangement

Effect	Case C	Case D
Cost Effect	√	√
Time Effect	√	√
Quality Effect		
Damage Business Relationships		
Loss of Productivity		
Reduction in investment profits		
Decrease the ratings of contractors in financial prequalification evaluations		

As illustrated in the table, even though some effects of disputes were identified through literature those were not identified through cases (Damage Business Relationship, Loss of productivity, Reduction in investment profits, Decrease the ratings of contractors in financial prequalification evaluations)

4.3.2.3 Relationship between procurement system and disputes

According to the Hasanzadeh, Esmaeili and Nasrollahi (2018) DBB is known to adversarial relationships among project participants. Further researcher stated that in a traditional contract designer and the contractor, whose having different goals and interests, contract with owner separately and it may lead to disputes. Further, according to Bourn 2001, excessive variations due to inaccurate bills of quantities are well known cause for construction disputes. In selected cases also it was identified that there were more variations due to inaccurate Bills of quantities since it was based on preliminary drawings. Other than that most of the variations within the traditional procurement arrangement was due to lack of communication, owner initiated variations, lack of tem spirit, Design changes and improper variation procedure.

4.3.2.4 Suggestions to minimize the Construction disputes

According to the Expert opinions of the interviewers following suggestions were made to minimize the disputes of Design and Build projects.

Table 4-7: Suggestions to minimize construction disputes in traditional arrangement

Suggestions to Minimize Construction Disputes	Case C	Case D
Employment of Qualified Personnel with specialized knowledge to handle the project by Client	√	√
At design stage should ensure proper planning and clearly reflect the Client`s requirements at the beginning	√	√

Improvement in communication channels and clear line of Authority within the project	√	√
Effective Teamwork	√	√
Improve Positive attitude of Project Managers to all issues	√	

4.3.3 Cross case Analysis: D&B Vs. Traditional Procurement Arrangement

In the above sections Design and Build procurement arrangement and Traditional procurement arrangement separately analysed and identify the causes of disputes, effects of disputes, relationship between procurement arrangement and give suggestions to minimize the disputes within procurement arrangements separately. In this section analysis has carried out between those two procurement arrangements.

4.3.3.1 Causes for disputes in Sri Lankan construction industry

The identified causes of disputes within the Traditional Procurement Arrangement and Design & Build Procurement Arrangement summarized in Table 4-8.

Table 4-8: Dispute Causes in Design & Build and Traditional Procurement Arrangements

Categories of Disputes	Causes of Disputes identified in literature	Causes of Disputes Identified in Cases	
		Design & Build	Traditional
Owner Related	Deficient management, supervision and coordination effort on the part of the project	√	√
	Project scope definition not clear	√	
	Variations initiated by the owner	√	√
	Change of scope	√	
	Payment delays	√	√
Contractor related	Inadequate contractor's management, supervision and coordination	√	

	Inadequate project handling experience of contractors	√	
Consultant/Design related	Failure to understand its responsibilities under the design team contract	√	
	Design errors and omissions		√
Human Behavioural related	Poor communication among project team	√	√
	Poor interpersonal skills	√	√
	Lack of team spirit	√	√
	Negligence or negative attitude of Project Participants	√	

As illustrated in table 4.6, one common reason for disputes identified through this research by analysing both D&B and Traditional procurement arrangement systems was poor management, supervision and coordination of the project by client's party. In the both scenarios client's party was managing the project. Client's lack of knowledge about handling projects grounds to management and coordination problems. Apart from that variations initiated by the owner, Poor communication among project team, poor interpersonal skills, Lack of team spirit identified as common causes of disputes among two procurement methods.

According to the D&B arrangement case scenarios there were no great influence from the client's team, who has the knowledge about the whole project scope and construction requirement. There should be one person who has the authority, and decisions must be taken through that appointed person. This was highlighted from the design and build project but this can be affective for the other projects too. Another vital outcome through design and build procurement arrangement system was that there was not authorized person to give instructions instruction through him and there were conflict occurred when going for number of client's representatives interests. Further, non-appointment of whole project team at the beginning were also identified as a causes of dispute in Design & Build procurement. Introducing some team members during construction was highlighted in D&B projects and it leads to disputes in the projects because they do not know what happened in the early stages of the

project and no clear idea about project, it was very difficult for other parties to deal with.

In the traditional procurement arrangement inaccurate bills of quantities and Design errors leads to disputes apart from the common causes identified within both procurement arrangements

4.3.3.2 Effects of disputes in Sri Lankan construction industry

In depth analysis of both Design & Build Procurement arrangement and traditional procurement arrangement it was identified that cost overrun and time overrun were common for the both procurement arrangements as a result of disputes.

Table 4-9: Effects of disputes in Design & Build and Traditional procurement arrangement

Effect	Design & Build	Traditional
Cost Effect	√	√
Time Effect	√	√

4.3.3.4 Relationship between procurement system and disputes

Even though literature suggest that Design & Build procurement method is less prone to disputes than traditional procurement, there were no significant difference between disputes causes between two procurement methods. In both procurement arrangements it was highlighted that the deficient management, supervision and coordination by the Client, Changes in scope, inadequate communication channel, lack of Design Management, Lack of team work leads to disputes. Therefore, it implies that project participants cannot expect less disputes in the projects based on the procurement arrangement used for the project. Rather it depends on the in clear line of authority, proper communication channel, proper planning at the design stage, team working and clear scope definition.

4.3.3.5 Suggestions to minimize the Construction disputes within different procurement arrangements

According to above discussion analysis, the identified suggestions are summarized here to minimize disputes, which occurred in different procurements arrangements of the projects which are related to the procurement arrangements separately and commonly. The summarized suggestions through expert opinions were illustrated in the Table 4-10.

Table 4-10: Suggestions to minimize disputes in Design & Build and Traditional procurement arrangement

Suggestions to Minimize Construction Disputes	Design & Build Procurement Arrangement	Traditional Procurement Arrangement
Appoint a Qualified Personnel with specialized knowledge to handle the project by Client	√	√
At design stage should ensure proper planning and clearly reflect the Client`s requirements at the beginning	√	√
Improvement in communication channels and clear line of Authority within the project	√	√
Effective Teamwork	√	√
Improve Positive attitude of Project Managers to all issues	√	√
Training of project managers to acquire essential skills	√	
Improve project participants Knowledge regarding procurement method	√	
Provide clear understanding of the contract to the site managers	√	
Implementation of a design management team early in the project by Contractor	√	
All Key personnel of the team should be appointed at the project commencement	√	
Involve all the potential site team during the tender period	√	

- **Appoint a Qualified Personnel with specialized knowledge to handle the project by Client**

To get better end production as per the client requirement, client's party should name one authorized person who has specialized knowledge to give all instruction through him. If many people are involved in instructing to contractor or consultant party it may lead to make conflicts in project. Scrutinized suggestions, which cause to Design and Build Procurement Arrangement by both cases is, client should name person as his representative, who has knowledge about client's end building functioning and construction. In Design and Build Procurement Arrangement, design is done by contractors and it should be approved by the client's party. Therefore, to get better production after construction, client's party must have a good understanding of the design construction drawing and should get clear idea what will be the outcome. Further, it is necessary to check whether the final outcome will match to its functional requirements. Further in both arrangements it was identified that there was very lack of coordination on client side to the project while Client`s involvement is very essential to achieve the Client requirement through Contractors. Therefore it is very important to appoint a Qualified Personnel with specialized knowledge to handle the project by Client.

- **At design stage should ensure proper planning and clearly reflect the Client`s requirements at the beginning**

As described earlier most of the disputes in Design & Build projects occurred due to the inadequate definition of client requirement and lack of planning of the Client. Further in Traditional procurement also client has changed the scope many times without considering the consequences leading to disputes. Therefore by ensuring proper planning and clearly stating the client requirement at the beginning of the project these disputes can be minimized.

- **Improvement in communication channels and clear line of Authority within the project**

In the construction project level, it is a vital task passing the all information regarding the project to all participants of the project. Otherwise lack of information always leads to disputes in the project. As discussed in earlier sections most of the disputes in Design & Build arrangement as well as traditional method occurred due to lack of communication between parties at the design stage as well as construction stage. Further it is important to have a proper line of authority to give instructions to whole project team so it is very clear and project participants would not confuse from whom they should take the instructions. By having a proper line of authority and communication channel will improve the coordination and management of the project leading to less disputes in the project.

- **Effective Teamwork**

It is important that project team members work together at the commencement stage to completion stage since it leads to better coordination and communication between the project members. This will leads to minimize the disputes in the project.

- **Improve Positive attitude of Project Managers to all issues**

Most of the time it is Project Managers who is having the power to manage the project. Therefore, if he have a positive attitude towards the all issues of the project rather than blaming the situation he can positively manage the project. He can develop healthy relationship with all team members and give them proper instructions leading to minimum disputes within the project.

- **Training of project managers to acquire essential skills**

As the leaders of the construction team, project managers should get a training regarding different procurement arrangements, leadership qualities, and management to properly handle the workforce.

- **Improve project participants Knowledge regarding procurement method**

Through the analysis it was identified that it is required to improve Project participants knowledge about all PAs and its inter relationship and responsibility breakdown to select suitable procurement team and for monitor the project team properly. For a project which was procured under any kind of procurement arrangement it is very important to manage the project properly and understand the roles and responsibilities of each participants of the project. Because ultimately construction project become a reality by gathering of a different kind of professionals, workers who is having different kind of goals. So it is very important to give them a proper knowledge about their responsibilities to get their work to successful completion of the project. If they don't understand their role properly it leads to disputes.

- **Provide clear understanding of the contract to the site managers**

Since site managers are the ones who are involving in physical construction at the site it is essential to educate them regarding the Contract and requirement of the project to achieve the project goals.

- **Implementation of a design management team early in the project by Contractor**

As identified in the selected cases many disputes were raised in the Design & Build Procurement arrangement due to lack of coordination in the design stage among Client and the Contractor. Therefore, appointing a design management team early in the project will help to properly manage the design by coordination with the Client as well as Contractor team and this will reduce the disputes occurring due to design changes.

- **All Key personnel of the team should be appointed at the project commencement**

As mentioned in the analysis all key personnel of the project team should be appointed at the project commencement. By appointing all key personnel at the commencement they can get a better understanding of the project and their responsibilities. Further

proper coordination and project schedule planning can be achieved from this movement ultimately leading to less disputes in the project.

- **Involve all the potential site team during the tender period**

By involving the potential site team in the tender period they can get a clear idea of the project at the commencement itself and this will reduce the information gap of the team and increase the communication while reducing the disputes.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter mainly delivers conclusions and recommendations on the findings of the multiple-case analysis which was carried out in previous chapter. Recommendations have been given to minimize disputes within D&B and Traditional procurement arrangement in construction industry. Further, limitations of the research and the further research directions are also discussed end of this chapter.

5.2 Conclusions under the research objectives

The aim of this study was to "Provide suggestions to minimize disputes in different procurement arrangements." Through this research, researcher scrutinized procurement arrangements in the world construction industry and identified practically most applicable procurement arrangement in Sri Lankan construction industry. According to the literature, traditional procurement arrangement was the mostly used procurement arrangement in the SL construction industry while Design and Build procurement arrangement was used secondly. Four objectives were established to achieve the aim of the research and concluded research findings.

Objective 01: Identify the causes for disputes in Sri Lankan construction industry

The first objective of the research was to identify the causes of disputes in Sri Lankan Construction Industry. To achieve this objective researcher firstly identified the causes of disputes through literature. Various researches had categorized the causes of disputes under different criteria. However, most of the dispute causes were common. After identifying the dispute causes through literature researcher identified the causes of disputes in Sri Lankan construction industry by analysing the cases. According to the research findings deficient management, supervision and coordination effort of the Client, Variations initiated by the owner, Poor communication among project team, poor interpersonal skills, Lack of team spirit, Design changes were identified as common causes of disputes in both procurement arrangements.

Objective 02: Identify the effects of disputes in Sri Lankan construction industry

The second objective of the research was to identify the effects of disputes in Sri Lankan construction industry. Through the literature review number of effects due to disputes has identified. However, Cost overrun and time overrun has identified as effects of disputes in selected cases.

Objective 03: Explore the relationship between procurement system and disputes

The Third objective was established to explore the relationship between procurement system and disputes. Through the literature review it was identified that some researchers have identified the Design & Build arrangement as claim reduction arrangement while Traditional method identified as an adversarial method which is prone to disputes. However, when analysing the selected cases most of the causes of disputes were common to both procurement arrangements. In the design & Build procurement method communication and personality issues were highlighted.

Objective 04: Suggestions to minimize the construction disputes within different procurement arrangements

The final objective was established to provide suggestions to minimize the disputes within different procurement arrangements. According to the research findings causes of disputes were common within the projects procured via traditional procurement arrangement and design & build procurement arrangement. Therefore the research suggest that rather than expecting less disputes based on the selected procurement method adequate structure should implement within the selected procurement arrangement to minimize the disputes within the project. The next section will present the recommendations based on the research study carried out.

5.3 Recommendations

According to the research findings following recommendations can be made to minimize the disputes in Sri Lankan construction industry

- Appoint a Qualified Personnel with specialized knowledge to handle the project by Client
- At design stage should ensure proper planning and clearly reflect the Client`s requirements at the beginning
- Improvement in communication channels and clear line of Authority within the project
- Effective Teamwork
- Improve Positive attitude of Project Managers to all issues
- Training of project managers to acquire essential skills
- Improve project participants Knowledge regarding procurement method
- Provide clear understanding of the contract to the site managers
- Implementation of a design management team early in the project by Contractor
- All Key personnel of the team should be appointed at the project commencement
- Involve all the potential site team during the tender period

5.4 **Limitation**

Mainly, the cases for this study were selected on Construction projects based on traditional procurement method and on design and build projects in Sri Lanka and with project period of more than one years. Therefore, the generalization of the research findings can be done limited to the same population. As the research data is based on opinions of people which hold a subjective perception in its nature and other accessibility issues to the project and team information limits the generalization of the research findings.

5.5 Further research direction

Followings could be given as suggestions for further research which emerged out of the study carried out.

- Quantitative research can be carried out to identification of the Disputes in Traditional and Design & Build Procurement methods in Sri Lanka.
- A study on applicability of suggestions to minimize conflict through implementing in practice.
- Qualitative Research on how behavioural attitude of the parties effect to immerge Disputes in Sri Lanka

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ANNEXES A: INTERVIEW GUIDELINES

Overview of the study

Overview of the Study

The research is aim to provide suggestions to minimize construction disputes which arising out of Traditional and Design and Build arrangements in Sri Lanka. Interview guidelines were structured to identify the Disputes arising out of the project, identify dispute arise areas, causes of disputes, Responsible party to the dispute and actions taken to handle the situation.

Confidentiality Statement

dissertation for the aware of Master of Science degree in Construction Law & Dispute Resolution. Moreover this research is not a document published to refer by general public, which is only referred within the university premises. Thus, all the responses will be kept confidential. However to maintain confidentiality, the actual names of the interviewees will be not revealed in this report or any other document relating to this study.

Interview Procedure

The interviews will be conducted with three key participants of the construction project team; client or his representative, contractor's site manager or QS and one of the key members from the consultant. Note taking and tape recording (with permission of the interviewee) will be doing while interviewing to collect data accurately.

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General Introduction of the Interviewee

Name of the organization:

Name of the Interviewee:

Designation:

Date of interview:

Venue:

Duration:

General Introduction of the Project

1. Can you explain briefly about your role in this project?
2. Can you explain the time period that you joined into this project team?
3. Can you give a brief introduction about the project, including the scope, client, cost and the procurement method?
4. How client specify his scope?
5. As a Client/Consultant/Contractor are you satisfy about its performing?

Disputes arising out of the project

6. Can you briefly explain key conflict/Dispute situations that you were faced during the design stage of this project?

a) What were their effects?

b) What were the main sources (involvement) of those conflicts?

7. Can you briefly explain key conflict/Dispute situations that you were faced during the construction stage of this project?

a) What were their effects?

b) What were the main sources (involvement) of those conflicts?

Mitigation Measures Taken

8. Can you explain the Areas/Issues on which conflicts/Disputes were experienced?
9. What are the causes of conflicts/Disputes on each area/Issue identified?
10. Is this project success as D&B/Traditional arrangement project?
11. What is the significance of project management/contract administration to minimize Disputes?
12. How is the behavioural attitude of the parties contribute to the dispute avoidance of the project?
13. What are the suggestions to minimize the disputes in each the in procurement method?

I would like to thank you for the information given and time you have dedicated to this research. If you are interested to know the outcome of this research, it would be my pleasure to share it with you.

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