Conflict in Architectural Projects – Diagnosis and Avoidance

A Study Based on Saudi Arabian Construction Industry

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Abdullah Mohammed Alshehri

School of Mechanical, Aerospace and Civil Engineering

Declaration

I hereby declare that this thesis has not previously been accepted in substance for any degree and is not being concurrently submitted in candidature for any degree. I declare that this thesis is the result of my own investigations, except where otherwise stated. I also give consent for my thesis, if accepted, to be available for photocopying and for inter-Library loan and for the title and summary to be made available to outside organisations.

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Abstract

The main purpose of this research project was to bridge the existing knowledge gap in the empirical identification and understanding of how conflict occurs between key project parties within Saudi Arabia's public sector building projects. Such conflict has become an increasingly endemic feature within the last 20 years, and this research project provides a contribution in knowledge terms which will help to overcome the obstacles and challenges impeding growth and development in the field. This was achieved by conducting an investigation to provide the theoretical background about the antecedents of conflict, and presenting a number of project management suggestions to avoid or minimise.

Both qualitative and quantitative research approaches were utilised in this study. The qualitative research data was obtained from 30 in-depth semi-structured interviews with four types of key project party, namely, project owners, consultants, contractors, and sub-contractors. This was followed by two separate questionnaire surveys. The first was a means of validating conflict data obtained from the interviews, and the second was used to test Project Management - PM data, . In this part of the study, 672 questionnaires were sent to various people engaged in the Saudi Arabian construction industry. The response rate was 46.1% (n = 310).

In terms of the interview data, a total of 349 data items were derived and from these data items, 30 general themes emerged concerning various causes of conflict and the latent conditions of conflict, providing descriptions of what and how conflicts arise within Saudi Arabian public building projects. From these general themes, 31 recommendations for strategic project management processes are made, with the intention of preventing or at least minimising conflict. The quantitative survey conducted to test these project management strategies (recommendations) revealed that all of them were supported. The study subsequently produced a cyclical framework of conflict avoidance, derived from the research methodology used in the study, and this is outlined to enable project building participants, whether individuals, groups, or organisations, to improve their project management strategy from project to project.

The research recommends that: generally, certain project management strategies should be implemented in the earlier phases of a project in order to promote conflict avoidance behaviours or at least to effect a reduction in these.. Furthermore, strategic actions are required to deal with the latent condition-related issues in respect of building projects in the Saudi Arabian context. In this case, reforms to current practices are required to improve the performance within the building industry. It is also recommended that further research be undertaken to explore other latent conditions of conflict and conflicts themselves in order to develop additional project management strategies aimed at managing the causes of conflict.

Keywords: conflict causes, project management strategy, building projects, public sector, Saudi Arabia

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List of Acronyms

AP	Average Performance
BOOT	Build-Own-Operate-Transfer
BOQ	Bills of Quantities
CII	Construction Industry Institute
CIOB	Chartered Institute of Building
DBF	Design Build Finance Operation
DSB	Design Drawings, Specification and Bill of Quantities
DSC	Different Soil Condition
FIDIC	(Fédération Internationale Des Ingénieurs-Conseils) International Federation of Consulting Engineers
GCC	Gulf Cooperation Council
GDP	Gross Domestic Product
GDSR	Geotechnical Design Summary Report
GTP	Government Tenders and Procurement
OGC	Office of Government Commerce
PFI	Public Finance Imitative
PLC	Project Life Cycle
PM	Project Management
PM	Strategy Project Management Strategy
PMI	Project Management Institute
PO	Project Case
PPP	Public Private Partnership
PWC	Public Works Contract
QBS	Qualification Based Selection
RTS	Recommendations Test Survey
UK	United Kingdom
UMIST	University of Manchester Institute of Science and Technology
US	United States

CHAPTER ONE

General Introduction

1.1 Introduction and Statement of the Research Problem

Many researchers, such as Fenn et al. (1998) and Cheung and Yiu (2006), have stated that the construction industry exists within an adversarial environment and that conflict is unavoidable. However, notwithstanding such inevitability, serious disputes can be very damaging to a great many stakeholders, and as noted by Jannadia (2000), in Saudi Arabia, this type of conflict is prevalent, having become increasingly common since the 1980s. For example, in 2006, 45% of the litigation cases within the Shari'ah courts and the Board of Grievances were concerned with construction disputes or projects (Al-Rabiah, 2006). Clearly, such a magnitude of conflict needs to be explored and understood so that the causes of conflicts and how these causes are being, and should be, managed in building projects in Saudi Arabia, are examined and documented. Additionally, there is a need to make project management recommendations on how conflict can be strategically avoided, and at the least, reduced in the most efficient manner. The research project reported in this thesis is a response to the circumstances described.

This chapter provides the starting point for acquiring the theoretical background and knowledge for this research. It presents a comprehensive presentation of the background to the study in Section 1.2. A rationale for the study is produced in Section 1.3. Section 1.4 specifies the study's aim and objectives, and in Section 1.5, a brief indication of the research methodology adopted is given. Section 1.6 considers the scope of the work and in particular indicates the contributions to knowledge and to practitioners that the study outcomes will bring. The thesis is presented in ten chapters, each one of which is briefly summarised in Section 1.7 which brings the chapter to a close by indicating how the rest of the thesis is structured.

The chapter also provides a general introduction to conflict in construction industry , beginning by considering the concept of conflict in Section 1.8.1, since without this understanding it is difficult to appreciate the exact problem being studied. In Section 1.8.2, the chapter proceeds to present some information about the uniqueness of the construction industry compared with other industries, and in Section 1.8.3, the reasons why conflict is inevitable in the building industry are presented. These two sections therefore provide an impression of the general environment in which construction projects are undertaken. The chapter continues by introducing the very specific context of the Saudi Arabian construction industry (Section 1.8.4), and moves to introduce the regulations pertaining to construction within the public sector (Section 1.8.5). Finally, Section 1.8.6 gives an indication of the importance of national systems and culture as key players which have influences upon human and business relationships, and hence, can represent sources of diverse forms of conflict.

1.2 Background to the Research

As discussed thus far, and as many researchers such as Fenn et al (1998) and Cheung and Yiu (2006) have stated, the construction industry exists within an adversarial environment and conflict is unavoidable. A large amount of research has been conducted to address this problem with the aim of determining the causes of conflicts as well as suggesting the most appropriate conflict solution process for them (e.g. Watts and Scrivener, 1993; Semple et al, 1994; Steen, 1994; Bristow, 1995; Treacy, 1995; Kumaraswamy, 1996; Cheung, 1998; Kennedy, 2006). However, when this research was reviewed critically, it was found that the majority of it was based on quantitative approach methods, most often through questionnaire surveys, or by analysis or examination of case studies (e.g. Watts and Scrivener, 1993). Noticeably, much of the literature containing this research is saturated with theorising about the causes of conflicts but has limited empirical evidence to justify the theories (of causes of conflict) that have been listed or presented.

In fact, Fenn et al, previously in 1997, declared this when they noted the following:

> "The literature offers much theorizing about the causes of disputes (see Harris (1988, p. 308) for a review). However, it seems that little empirical evidence has been structured to justify the theories presented" (Fenn et al, 1997).

Yet, it would appear that the observations made by Fenn et al (1997) are still pertinent, more than ten years on. Indeed, most of the research on conflict causes is considered to be pragmatic, and lacking in empirical evidence that has sought to determine the conditions underpinning the problem being addressed. In these studies, the conflict causes probably had two features: firstly, the causes of conflict are usually identified by being written with a very concise meaning; and secondly, the association between conflict variables (causes) namely, the underlying or latent conditions of conflict which often lead to conflict but not do so on this occasion, and the actual conflict, are not drawn or established. However, identifying each conflict cause in this way, while useful, does not explain the underlying causal nature of conflict. For example, the concept of ‘change order’, sometimes known as ‘variation order’ is probably one of the most common causes of conflicts or disputes between the project parties or teams. As far as *latent underlying conditions* are concerned, they may be attributed to several causes such as lack of design briefing, design errors, lack of communication which might perhaps ultimately contribute to the emergence of a conflict. Indeed, the researcher’s own personal experience is that one or more of these underlying latent conditions (e.g. not meeting the client requirements) might actually arise out of another underlying latent condition (e.g. lack of design briefing), and that ultimately these two factors together can precipitate yet more actual or apparent causes of conflict (e.g. variation order).

It is proposed that a deeper appreciation of the underlying conditions will generate a better understanding of the dynamics of conflict, thereby leading to a reduction in the incidence and consequential impact of conflict, as the questions of how and what conflicts arise, will be better answered. In other words, more detailed empirical evidence in the form of literature that could be structured to justify the theories presented would be available. In addition, this approach to conflict investigation could also provide some pointers or suggestions for appropriate management strategies and processes. Moreover, it could develop further project management strategies that might be considered to be more realistic as they would be proposed on the basis of empirical research that required determining the underlying conditions contributing to the problem being addressed.

1.3 Rationale for the Study

The rationale for the current study is found in the presentation so far, of the particular problem found within the construction industry, and its damaging impact specifically in the context of Saudi Arabia, where construction is part and parcel of the developing society. As already observed, the current literature does not identify *how* or *what* conflict is encouraged in the construction industry, and only with this intelligence is it possible to enable effective management of the problem by the relevant parties. Additionally, a rationale is provided by the gaps in the current literature, and the fact that as a result of this study, a contribution to that literature will be made. This issue is discussed in slightly more detail in Section 1.6 where the scope and contribution of the study is considered.

1.4 Aim and Objectives of the Study

The overarching aim of the study is to seek knowledge by determining the causes and types of conflict between the key project participants in large architectural building projects in Saudi Arabia. This requires an exploration of 'conflict associations' to establish the inter-relationships between latent conditions or antecedents of conflict and the actual conflict issues; as well as of why such conflict causes arise. Consequently, the study aims to provide recommendations on how the antecedents of conflict in construction projects can be strategically prevented or at least reduced in future projects.

In order to achieve these aims, six specific research objectives are formulated, these being:

(1) To identify the inherent causes of conflict inherent within large architectural building projects in Saudi Arabia, and why they exist. (See Chapter Five)

(2) To test the validity of the research data used to identify these causes of conflict. (See Chapter Six)

(3) To explore the 'conflict associations' between the latent conditions of conflict and the actual issues of conflict. (See Chapter Seven)

(4) To identify project management strategies for preventing or reducing the incidence and impact of conflicts. (See Chapter Eight)

(5) To explore the extent to which such project management strategies could be implemented within the Saudi Arabian construction industry to manage harmful conflict. (See Chapter Eight)

(6) To develop a generic industry framework providing project managers with a mechanism to identify further conflict, prevent and or control it. (See Chapter Nine)

1.5 Methodology

In order to achieve the above aim and objectives, the study employs two methods approach in which both quantitative and qualitative data from secondary and primary sources are collected. Secondary data is in the form of published literature found in academic journals and appropriate textbooks, whilst primary data is gathered from empirical work conducted in Saudi Arabia. Specifically, qualitative semi-structured interviews are used with individuals from four categories of key parties to the public construction contracting process (30 in total), and a quantitative questionnaire is randomly distributed to various people who engage with the Saudi Arabian construction industry (310 responses in total). The data are analysed thematically, the qualitative data being done manually, while the quantitative data was analysed using a computer programme, specifically SPSS.

1.6 Scope of the Study and Expected Contribution

The study concentrates on large architectural building projects in Saudi Arabia. It does not extend into other types of project, nor does it cover other countries. It is anticipated that the research outcomes will make two specific contributions to the literature. The first is that it will ameliorate the identification of *how* and *what* conflicts between the parties involved in construction projects are fostered, by justifying the theoretical basis of each potential antecedent of conflict. In this respect, the study will highlight the *latent conditions* which are sometimes related to a project's environment (such as processes, procedures and systems), and explore the associations between these and the actual conflict issues. This theoretical understanding will add to the literature, and will ultimately enable the parties concerned to manage the conflicts in more realistic and effective ways.

The second contribution of the study is the addition it provides to the literature relating to the construction industry. There are clear deficiencies in this area, especially in terms of the large architectural buildings that constitute part of the Saudi Arabian construction industry, and as conflict has become an endemic feature of this scenario, there is a need for in-depth exploration of its antecedents. Special attention has already been paid by professional bodies and governments, such as the Saudi Council of Engineers, to this problem, and hence a body of work is developing. It is intended that the outcomes of this research will become part of that body of work which will help to overcome the obstacles and challenges identified by the national authority as impeding growth and development, particularly in construction.

1.7 Structure of the Thesis

The thesis is presented in ten chapters, each of which is briefly summarised to provide some general guidance for the reader.

Chapter One has provided a general introduction to the thesis, functioning as a starting point from which to highlight the theoretical background to the research. The chapter provides a presentation of the general background to the study, and a rationale for conducting it. It has also presented the study's aim and objectives, together within indication of the methodology adopted. Additionally, it has indicated the scope of the study and pointed out its anticipated contributions to knowledge. The chapter has also functioned as a starting point for acquiring background information about conflict within the inherently unique context of the construction industry, signalling the inevitable impact of national systems and culture on the relationships between stakeholders in construction projects. In addition, a specific area of discussion has outlined the Saudi Arabian construction industry and other related issues that reflect the character of public building projects.

Chapter Two provides a detailed review of 'conflict theory' using the current literature on this topic. The purpose of this chapter is to provide the reader with some general and basic information such that s/he may be suitably prepared for understanding the research subject and discussion. Some of the topics introduced are included to support the content in subsequent chapters.

Chapter Three entitled 'Conflict in Project Management Research', presents a comprehensive review of earlier studies and interpretations of conflict both generally and with specific reference to project management. This chapter contains two main parts: the first deals with conflict studies conducted in a construction project environment, and the second concerns studies related to managing conflict.

Chapter Four concerns itself with the 'Research Methodology' adopted for the main investigation. It includes a full description of the qualitative and quantitative approaches used during the research programme.

Chapter Five presents 'The Analysis and Discussion of Data'. This is the longest chapter and contains the analysis of the empirical data and a discussion in a structured account. Many examples of responses provided by members of the research sample are provided as illustrations of their experience and opinions.

Chapter Six is concerned with the Data Validation. It describes the method used to validate the conflict data (not PM) from the interviews. Additionally, it provides the quantitative results obtained after processing the data, analyses them, and accordingly, presents a discussion.

Chapter Seven entitled 'Conflict Causation' unveils and maps out the nature of building projects in Saudi Arabia in terms of conflict causes. It indicates all of the conflict areas that are identified and discussed under separate topic headings in Chapter Five.

Chapter Eight presents the details relating to the testing of the recommendations arising from the interviewees. Entitled 'Recommendation Test for Construction Projects' the chapter contains a description of the Project Management (PM) Strategy data (recommendations), together with details of the numbers of those in the large random sample who responded to the effect that they either strongly agreed, or agreed, with each of the recommendations. It also provides details of how the survey was designed and conducted.

Chapter Nine presents a Framework for Conflict Avoidance suitable for use by all participants, whether individuals, groups, or indeed organisations, that are regularly involved in building project activities.

Chapter Ten provides Recommendations and Conclusions, and brings the thesis to an end. It presents a summary review of the research aim and objectives, incorporating the most important achievements of the study, and makes recommendations on the basis of the results. It indicates the limitations of the study and points to areas of further research.

1.8 Introduction to Conflict in the Construction Industry

1.8.1 The Concept of Conflict

Numerous attempts to define the concept of conflict can be found in the literature. According to Putman and Poole (1987), De Bono (1991), Donohue and Kolt (1992), Wall and Callister (1995), and Newcombe (1996), conflict is defined as a clash between two people or groups which arises when they perceive their interests, values, needs, actions, or direction in different ways which render them incompatible. Sometimes the terms ‘conflict’ and ‘dispute’ are used interchangeably, since both generally refer to the social elements of a common phenomenon, which are apparent in nearly all aspects of social life. However, in this research project, they are taken to mean two different things, conflict describing what happens before a dispute occurs.

Within the context of the construction project, both parties usually share the same objective, e.g. to finish the project on time. However, sometimes, ways of earning profit are not seen in the same way by contractors and project owners since each party seeks to maximise his own benefits. Moreover, in projects, differences or disagreements over matters arising from the contract could have a significant effect on some aspects of the project, such as performance. Consequently, for the purposes of this study, which is concerned with the construction context, the definition of conflict, provided by Chinyio (2010:286), which is that it is a “process that begins whenever an individual or group feels negatively affected by another individual or group”, is adopted.

In short, this definition purports to say that people are in conflict whenever the actions of one party obstruct or make the performance of others less efficient.

1.8.2 The Uniqueness of the Construction Industry

The construction industry, as Ballard and Howell (1998) suggest, is ‘unique’. This assertion of uniqueness in terms of construction projects is attributed to a combination of two characteristics. Firstly, the projects (the product) belong to the category of fixed-position manufacturing. Construction possesses the characteristics of site-based production, which means that assembly must be performed on site. Secondly, the product is rooted in one place. This brings with it uncertainty and differentiation. For example, soil conditions can vary widely from place to place and are often difficult to determine precisely prior to actual production. Also, the people and organisations brought to a construction project will typically exist in that configuration only for the project’s duration (i.e. temporary teams). So accordingly, the construction industry possesses the characteristics of site-based production, has a product that is rooted in one place, and is produced by temporary teams.

These characteristics make construction a unique product, unlike other service and manufacturing sectors such as the car industry, where there are opportunities to prototype products and build long-term working relationships (i.e. develop trust). The manufacturers in these types of industry can build cumulative experiences as well as long working relationships with their workers. In addition, the people involved in this type of work can forge a clear understanding of 'what should be done' about the final product as they work with the systematic process of the manufacturing sector in which they are involved. On the other hand, each construction project, especially when it becomes more complex, reflects different or sometimes unique construction processes when compared with other projects.

Moreover, as each of these processes has a number of interfaces, it is difficult for the parties to develop a mutual understanding about the project (product) before embarking on it and it is at these interfaces that misunderstandings probably occur. Additionally, it is difficult for the parties and the teams involved in project activities to develop long-term working relationships which means that there is a great potential for misunderstanding and less opportunity for trust.

In these circumstances, it can be hard to identify misunderstandings before they escalate into conflicts and, potentially, into dispute**.** The nature and complexity of construction can amplify the potential for conflict. To some extent, defining the responsibilities of each party or team clearly at the outset of the project could avoid misunderstandings about the scope of interest and goals. Emmitt and Gorse (2003) indicate that the ability of the construction industry to avoid conflict is further hampered by the multi-disciplinary nature of project teams. That is to say, that as the complexity of construction projects requires it to call upon a great variety of expertise the knowledge of several professions is needed to address different aspects of the project. Each team member's underlying attitudes, values and goals will lead him/her to look at the project from a different perspective. Any attempt to impose one's own perspective on other parties or teams may lead to tension and conflict. Thus, different views can cause conflicts of interest.

1.8.3 Conflict is Inevitable

In recent decades, the construction industry has undergone more development than ever before. The management of projects has also developed in terms of safety, contracting and engineering practice. However, lack of management skills can prevent project managers and other members of an organisation from handling problems effectively, with the result that there is a greater likelihood of conflict occurring.

In the early 20th century, many conflicts were considered inevitable, but increasing knowledge of conflict management and professional practice has improved the situation. With increasing knowledge, construction practice will become more professional, which will reduce the number of problems and the occurrence of conflicts.

Fenn in 2002 states that poor quality, late and expensive which called them as 'adversarial attributions' problems in construction projects are repeated throughout the construction literature. He gave an example of the UK construction projects and highlights that contemporary empirical works and journals such as Constructing the Team (Latham Report, 1993), international synopses such as the Common Categories and Causes of Construction Claims **(**Kumarawamy**,** 1997), and Modernising Construction (The National Audit Office, 2001) all provide confirmation that construction projects are suffering from certain expressed 'wisdom' to the effect that:

1. Construction suffers more contractual disputes than any other industry.
2. The occurrence of disputes has risen recently and continues to rise.
3. The performance of the industry is adversely affected by disputes.

In this respect, however, he states that there is little empirical work to test such received wisdoms, and that random theorising is allowed to pass unchallenged.

That said, in Saudi Arabia, for instance, Jannadia (2002) has indicated that serious disputes concerning construction contracts have become increasingly common over the last two decades. And Alrby'ah has noted that in 2007, 60% of litigation in Shari'ah courts (Saudi Arabia's legal system), and the Board of Grievances (Diwan Al-Mathalem) concerned disputes over construction or commercial contracts (Al-Sultani, 2007). Similarly, activity in the London Official Referee's Court between 1973 and 1990 indicates that the number of cases going to court grew substantially. One could conclude, therefore, that not only is conflict in the form of dispute inevitable but that it is increasing (Hibberd and Newman 1999). In the same sense, Hellard (1992:36) agreed that conflict in the construction industry was inevitable when he wrote, "the organisation of the construction industry today has a built-in recipe for conflict". Indeed, most of the opinion expressed at the International Construction Management

Conference held by UMIST in September 1992 supported this view (Hibberd and Newman, 1999).

1.8.4 The Saudi Arabian Construction Industry

Relatively speaking, the construction industry in Saudi Arabia is young compared with industries in developed countries. Nonetheless, both the public and private sectors are major players in this industry from which benefits can be derived. Indeed, the public sector is concerned with financing the projects that belong to government ministries and other agencies to achieve the national development plan of the country, while the private sector comprises privately-owned construction or that which is subsidised either by a family corporation or a conglomerate (Al-Sedairy, 1999). Shoult (2006) observes that within the Kingdom, construction has largely developed in tandem with the rapid growth of the domestic economy, which has been fuelled by enormous oil revenues. In fact, as oil revenues constitute around 80% of the Kingdom's total revenues, the level of construction activity has tended to correlate with oil prices (Shoult, 2006).

It was reported by the Ministry of Planning in 1991 that the construction sector accounted for about 9% of the total gross domestic product (GDP), thereby making it one of the most important contributors to the economy (Saudi Ministry of Economy and Planning, 2008). Later, in December 2005, the Kingdom became a member of the World Trade Organization, thus opening the construction market to international firms, resulting in the country achieving the largest GDP in the Middle East. In addition, the rapidly growing population is driving a demand for affordable housing, and hence, the Saudi Arabian building and construction sector is poised to record unprecedented growth in the coming years.

Thus, it can be said that the country's construction activity has experienced a boom of unprecedented volume in the recent past, and this is set to continue as the industry undergoes rapid expansion (including erection of new cities, airports, public and private buildings, highways, etc.). Many of these projects face enormous challenges and perhaps market opportunities that may create difficulties. Such difficulties are alluded to by Jannadia et al (2002) who stated that over the previous two decades, serious disputes concerning construction contracts had become increasingly common in the Saudi Arabian construction industry. During that period, Al-Sultan (1999) conducted a survey to evaluate the time performance of public sector projects of various types. He found that 70% of these projects had experienced delays in terms of the set project schedules. At a later date, Assaf and Al-Hejji (2005) undertook a similar investigation for the projects funded by the Ministry of Housing and Public Works (public sector). They outlined 73 delay factors and ranked the importance of them according to perception of each of the project participants namely: owner, consultant, contractor and labourers. In around 70% of all the projects, delay in some form or other was indeed experienced with the accompanying knock-on effects. more recently, Mohammed (2007) investigated construction projects belonging to the public sector in terms of cost, finding that more than 60% of the projects studied involved cost overruns.

These findings demonstrate that the Kingdom's construction industry, at least in the public sector, operates in a highly adversarial environment. Indeed, Al-Reshed's study in 2002 confirms this claim, since having examined 77 dispute cases between government agents (public owners) and main contractors, he found that approximately 92% of cases took more than a year to hear, and some lasted up to eight years. Undoubtedly, this amount of time consumed by litigation is enormously damaging to all stakeholders. Additionally, Al-Rabiah (Al Eqtisadiah Newspaper, 2006) reported that approximately of 45% of all court disputes being processed within Shari'ah courts as well as in the Board of Grievances, concerned construction contracts, a figure he attributed to several reasons such as the nature of the construction industry, local culture, the national law, and the legal system.

Without doubt, the percentages revealed, produce a negative impression of the position of public projects within the construction industry, and demonstrate the importance of establishing a comprehensive research programme to determine the causes of conflict between key project parties.

1.8.5 Procurement Regulations and Public Sector Contracts

The Government Tenders and Procurement (GTP) law in the Kingdom of Saudi Arabia was introduced by the central government in 2006, by Royal Decree M/58 of 1427 (2006).

As all government authorities and bodies (e.g. ministries, departments, and public institutions) are considered by this law to be client representatives, they are empowered with full contracting authority to procure works and services including construction projects on behalf of the Central Government Procurement Authority. However, all works or services that need to be procured must be put out to public tender, unless exempted by the Procurement Law (Article 6). Both local and international companies interested in bidding on a government project are required to make themselves known to the specific government agency/ministry offering the project. This enables companies from the construction business to apply for involvement in building projects even if they are from outside the Kingdom (Article 70).

From a construction business perspective, when a project becomes available in the form of a tender, the government agency/ministry selects bidders from a list classified as prequalified/known companies and invites them to bid for that particular project. Indeed, the Saudi Government Tenders and Procurement Law (GTP) insists that all government bids be announced in the official Gazette (Arabic), in two local newspapers, and in the electronic media. After that, a competitive tendering process takes place among contractors which requires them to submit their tenders within a specific time. A direct head-to-head competition then occurs between the contractors which drives the search for competent and innovative companies, making the client representative’s job to appoint one of them extremely demanding (Al-Sedairy, 1999). In reality, the tender regulations give a preference to companies of Saudi origin which satisfy the requirements of the procurement and meet the national policy of encouraging national investment and enterprise. The law also bases the method and process of competitive tendering selection on price and, therefore, the number of competitors is usually narrowed down. Thus, by and large, the ‘lowest price’ or ‘lowest construction cost’ is the most usual criterion for appointment of contractors and/or sub-contractors by project owners (Article 21).As the process of selection is completed and ultimately a contractor is appointed, it is necessary to put the Public Works Contract (PWC) in place. The PWC is a standard form of contract for any entrants to the public sector construction industry in the Kingdom, determining the contractual relationship between government agents/ministries and contractors. In fact, the GTP law requires all government entities to use this approved form of contract. Any other drafts of contract or proposed exemptions from the GTP law are submitted to the Ministry of Finance which has the authority and the expertise to deal with them.

Notwithstanding the fact that the PWC is an old document, several amendments have been made by law at different times. Alhammad et al (2008) point out that it was drafted on the basis of the 1977 FIDIC construction (third edition, 1977) and has been used as a compulsory standard form of contract in the Kingdom since 1988. Recent amendments were made in 2007, and indeed, some of the amended articles/terms were made to comply with Shari'ah law. However, other aspects, such as risk allocation, lack of provisions and contractual mechanisms remain somewhat at odds with, and criticised by, some local project management researchers (Al-Abedien, 1995; Ibn Humiad, 2005; Aleroan, 2008; Arafh, 2008; Cowling, 2011).

Finally, despite the importance of the GTP law and the PWC for establishing the relationship between parties working in the public sector construction business, neither of them provides a fast settlement method when a dispute emerges. In fact, in these documents, the Board of Grievances is the only body to which disputed parties may refer their case. This, however, is a procedure that has been referred to in the literature on dispute resolution methods and common national systems practice worldwide, as disadvantageous as it is regarded as costly and time-consuming for all parties.

1.8.6 National System and Culture Differences

The word 'culture' describes the fabric of society which is derived from the host country or national system and involves its members (the public) in shared and common beliefs, values, attitudes and knowledge, and so on (Bodley,1994). Culture, has an enormous influence on people's daily lives and builds characteristics which make them distinct from each other. Bodley (1994) states that culture involves at least three components: what people think, what they do, and what material products they produce.

In terms of project management studies, culture is regarded as a key player, since it is one of the many possible causes of conflict and, yet at the same time, it is also one of the necessary tools available for managing conflict and resolving disputes on construction projects. In fact, this point has been pointed out by several authors such as Fellows (2006) and Weddikkara (2003) who clearly identify the project participants' culture as one of main contributors to conflict and disputes in projects. Likewise, Watts and Scrivener (1995) have found a significant similarity in the proportion of cases classified by the particular parties to disputes between Australia and the UK. They, however, attributed this to the similarities of the building contracts, the legal systems and several cultural aspects of the two countries. Moreover, Ntiyakunze (2011), in his consideration of the sources of conflicts in construction projects, points out several factors which include the nature of the project, the creation of a temporary multi-organisation, and time and financial constraints. He states that all of these factors are derived from the project participants' culture, attitudes, and the legal system that work alongside and within the construction industry.

However, conflict is not limited to a particular country or national system. Fenn et al (1998), in their book *Dispute Resolution and Conflict Management in Construction*, examined the different systems of 20 countries from Europe and North America to the Middle East and Asia. They found various and common conflict causes that occur in any identified national system location which may be supplemented by other specific conflict causes which are relevant to the nature of a certain country or region because of particular cultural, religious, political, economic, social and environmental elements. The following pronouncement is their conclusion:

> "Many construction conflicts and disputes are not limited to particular jurisdictions or cultures, but are common to an industry. Each national monograph provides a consistent and rigorous analysis of each national system, as well as the necessary tools for managing conflict and resolving disputes on construction projects" (Fenn et al, 1998: cover page)

In fact, Table 3.2 in Chapter Three demonstrates this interrelationship between conflict causes and the different national systems and cultures as it shows the divergent nature of conflict causes juxtaposed with each country or national system.

Additionally, there are authors who have highlighted the impact of these differences related to the culture and national system in terms of preferred methods of conflict resolution. Morris et al (1998), for instance, in their paper, *Accounting for cross-national differences*, highlighted the point that cultural differences impede the smooth resolution of conflicts between managers, while personality variables and the roles of the parties involved in the conflict could modify the perception of conflict styles and their predications. Furthermore, Goldsmith and Clutterbuck (1984) conducted a comparative study within the UK of 23 firms and concluded that a strong culture was a crucial element in maintaining the characteristics of a successful management style (Mullins, 1993). Similarly, Easterbrook et al (1993) have noted that many books on conducting commercial negotiations mention the role of negotiating or bargaining in different cultures around the world. Such observations reflect the fact that different cultures display conflict in different ways, and expect different behaviour when conflict occurs and when resolving it. Moreover, Hofstede (1980) highlighted the differences in terms of preferences for mechanisms of conflict resolution. He commented that in individualist societies (e.g. the USA) there is a preference for adjudicatory procedures, in which an independent judge makes the final decision; meanwhile in collectivist societies (e.g. China) the preference is for bargaining and mediation.

Therefore, as the literature reveals, there seems to be strong evidence that various cultures and national systems have a heavy influence on conflict while at the same time harbouring ways and means of how it can be managed or resolved.

CHAPTER TWO

Conflict Theory

2.1 Introduction

This chapter presents a comprehensive review of the literature relating to conflict with the intention of developing a deep understanding of the theoretical background to the study. Essentially, the chapter is divided into two parts. The first part concerns itself with the concept of conflict, and essentially is covered by Sections 2.2 - 2.5. These sections discuss the way in which conflict is understood as a general phenomenon, how conflict escalates into dispute, levels of conflict, and the conflict cycle. The second part of the chapter from Section 2.6–2.8, considers the antecedents of conflict (latent conditions), and the processual development of conflict, demonstrated through five stages, which can be used as a means of analysing the strength of a particular conflict, and possibly diluting it. The chapter ends with a short conclusion in Section 2.9.

2.2 Understanding Conflict

The word 'conflict' is often perceived as having a negative meaning, being synonymous with words such as *clash, collision, fight, strife, battle* and *struggle.* It describes a situation where disagreement occurs between two or more opposite individuals or groups. Moreover, it sometimes brings to mind the notion that 'action should be taken' as it is usually considered to be a negative power which may have a negative impact, and so needs to be stopped, avoided or at least minimised. However, from this old traditional view of conflict which reflects only a negative character, a more recent perspective has emerged in which 'conflict' is perceived as also having a constructive or competitive nature, when considered by organisations seeking to manage their projects more effectively. Indeed, this has become a common belief among notable authors including Kezsbom et al (1989:p216) who argue, "if managed and approach effectively, conflict can be a vehicle for change, an integral part of problem-solving, and a catalyst that synergizes diverse ideas and improves relations". This topic is discussed in greater detail in Section 2.8.

The harmful consequences of conflict in projects is widely recognised and a great number of conflicts have been researched in terms of their effects, such as project incompletion (stopping), delay, extra cost, etc. Examples of some such studies are tabulated in Chapter Three (specifically in Tables 3.1 and 3.2). In addition, conflict can sometimes destroy entire contractual relationships between project parties. It is true that a certain inevitability exists in respect of conflict, yet it is important to try to reduce this since conflict can have serious consequences. Moreover, it can arise in many situations during the lifespan of a construction project (see Appendix A, Section 2). Clearly, effective project management is important in this respect, since if properly managed, conflict might be prevented or minimised, but for this to happened, project managers and other participants must be able to recognise the causes of conflict as the first step in determining how to deal with potential conflicts in both the short and long term. This knowledge would help managers to develop strategies and techniques to prevent, dissolve, and manage these conflict causes, with the eventual outcome of team satisfaction, and project success.

2.3 The Escalation of Conflict into Dispute

Generally speaking, both conflict and dispute are derived from disagreements that arise when parties have cause to share a common agreed activity. Yiu and Cheung (2006) stated that such disagreements lead to an event or a series of events and circumstances that result in one or both parties having a grievance against the other. Conflict (but not dispute) is inevitable, according to Fenn et al (1997), who reviewed the conceptual difference between the two in the literature on conflict and dispute in construction. They indicated that conflict might be seen as the functional and necessary part. Dispute, on the other hand, only develops when conflict is not (or cannot be) managed; therefore, dispute is the unnecessary or dysfunctional element.

In addition, the conflict-management approach rests on the assumption that conflict can be managed and subsequently avoided, and outlines how to deal with conflict without the need for third-party intervention. Dispute is usually associated with distinct issues and requires resolution. The process of dispute resolution lends itself to third-party intervention; thus logically, there should be two areas for consideration: *Conflict management* and *Dispute resolution.*

According to Totterdill (1997), for a conflict to escalate into a specific dispute, a certain sequence of events must have taken place as follows:

- Something happened: an instruction, query, unexpected natural event or other problem.
- Someone suffered: from either an additional direct cost or a delay that would cause additional cost.
- The person who suffered (or thought he had suffered) asked for compensation.
- The request for compensation was denied; the person who suffered did not accept the rejection.

Gebken (2006) declared that disputes are most costly and time-consuming for all parties if they become formal claims; and that it is better to resolve the dispute as early and amicably as possible in the workplace without third-party intervention, since this results in less cost and stress for all parties and reduces the likelihood of any further deterioration in the relationship between the two parties. Gibbons (2007) indicates that resolving disputes successfully in the workplace results in better employment relations, increased productivity, lower human-resources costs and fewer employment tribunal claims. He observes that the current dispute-resolution system in Great Britain is costing all parties too much in terms of both money and time, and that disputes need to be resolved at the earliest opportunity.

In 1995, Wall and Callister proposed a model of the escalation of conflict, which was amended by Cox and Thompson (1998) and which is shown as Figure 2.1. The model highlights five important stages that begin with the discovery of a problem within a project. At each subsequent stage there is a breakdown or a failure in the *interests* of the parties and conflict escalates. The problem arises through a difference of opinion or view between the project parties over some aspect(s) of the project, and continues to develop either because the problem is ignored or because there is no apparent resolution to the problem. As can be seen from Figure 2.1, there are opportunities for resolving the conflict up to point where a claim is made, after when, there are only opportunities to resolve the dispute. And, as shown in model, once the dispute is fully fledged, the next step is resolution through legal action (Cox and Thompson, 1998).

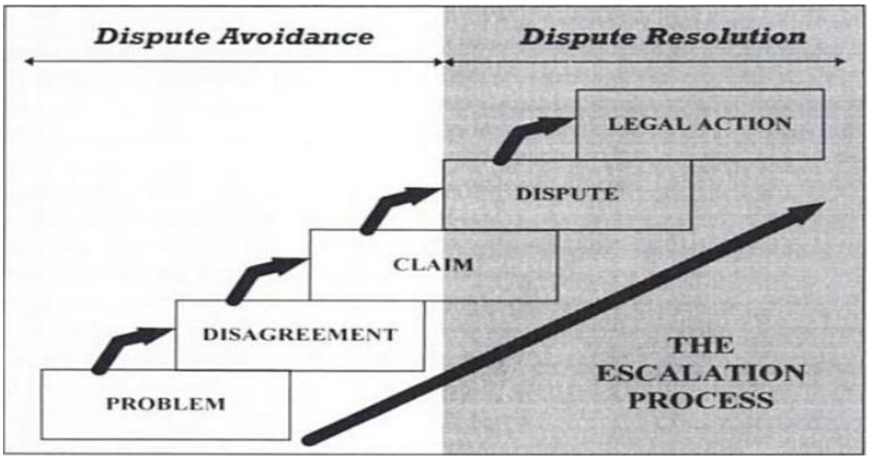


Figure 2.1: Conflict Escalation Process (Source Cox and Thompson, 1998: p250)

2.4 Levels of Conflict

Conflict has been explored at three main levels namely, personal, group and organisational. However, Hellriegel et al (1986) expanded these levels to become five, these being: intra-personal, inter-personal, intra-group, inter-group and intra-organisational. Briefly, at the inter-personal level, two or more individuals (not representing the group of which they are a part) come into conflict with each other whether they are from the same or different groups at the same or different level, if in an organisation. The conflict at intra-group level usually occurs between some or all of a group's members within the organisation. The conflict at inter-group level emerges between at least two groups working together at the same or different level if they work in an organisation or on a project.

2.4.1 Intra-personal Conflict

This occurs within an individual and often involves some form of conflicting goals, such as when an action involves both positive and negative outcomes. For example, if a newly graduated civil engineer is offered a new job in the private sector which offers a higher salary but less job security than his current post in the public sector, he is in a situation of intra-personal conflict.

2.4.2 Inter-personal Conflict

This form of conflict occurs between two or more individuals who have divergent or opposite outcomes (goals), attitudes, values or behaviour. This may happen, for example, if a main contractor faces unexpected problems that cause the schedule to be delayed by one month yet the project owner does not believe these problems should have impeded the progress of the project, and hence, perceives the delay as being unjustified. Here, the main contractor may consider that it is unfair to allocate risk entirely to him and that the project owner should share the risk, so he is not prepared to pay the entire penalty amount that the project owner is pursuing. In this situation, the main contractor can be said to be in inter-personal conflict with the client. Hellriegel (1986) has indicated that parties in inter-personal conflicts usually demonstrate at least one of the following four behaviours:

- Ignoring the disagreement, staying away from conflict and carrying on the project. This style of behaviour usually leads to unfavourable results.
- One party tries to achieve his own goals without considering those of the other party. By necessity, one party must win and the other must lose. This behaviour tends to lead to unfavourable results and contains a high probability of third-party intervention.
- Continuing the relationship, presenting co-operative behaviour but not assertive. The party may represent an unselfish act, looking to a long-term relationship strategy to encourage co-operation by others, or submission to the wishes of the others. This style of behaviour usually leads to favourable results.
- Continuing the project with a strongly co-operative relationship and assertive behaviours. People with this behaviour looking at problems from a neutral point of view and trying to solve them. This style of behaviour usually leads to co-collaboration desire to maximise joint outcomes.

2.4.3 Intra-group Conflict

This involves more people than intra-personal and inter-personal conflict: it is conflict between some or all of a group’s members within the organisation. Medina (2005) distinguished between two kinds of intra-group conflict: task conflict and relationship conflict.

Task conflict is concerned with controversy among a group of construction-project members or individuals. It may concern differences of opinion, viewpoints, interests or decisions. Examples of task conflict are conflicts among stakeholders about procedures or guidelines and about the interpretation of facts.

Relationship conflict is based on inter-personal incompatibility, and includes annoyance and animosity among individuals. Examples of relationship conflict are disagreements about values, personal or family norms, or personal taste. Medina et al (2005:p220) summed up these two types as follows:

> "The two types of intra-group conflict have different personal and organizational [aspects … Relationship conflict is negatively associated with employees' affective reactions … and it reduces team effectiveness. In contrast, task conflict appears to be positively related to the quality of ideas and innovation, the increase of constructive debate, the affective acceptance of group decisions and the prevention of groupthink."

2.4.4 Inter-group Conflicts

This is conflict that involves two or more groups within an organisation. It is occurs between groups of people based on race, ethnicity or levels of decision-making, and also occurs between unions and management. Examples of such conflicts in the construction industry include a contractor's workforce striking because the board of directors (the other group) refuses to increase their wages.

Belak (1998:p1) discusses the causes of inter-group conflict, asserting that:

> "One of the most prominent reasons for intergroup conflict is simply the nature of the group. Other reasons may be work interdependence, goal variances, differences in perceptions, and the increased demand for specialists. Also, individual members of a group often play a role in the initiation of group conflict …"

Inter-group conflicts are sometimes extreme and long-lasting, and could result in extra costs being incurred by the groups involved. Fisher (2000:166-184) argues that such conflicts can be managed, although this involves a great deal of time and effort, saying:

> "Intergroup conflicts involve both objective and subjective elements, both of which must be addressed for effective de-escalation … because intergroup conflicts are so complex, intervention must begin with a thorough conflict analysis. Conflict resolution requires both change in subjective relationships and processes, and change in objective structures and systems".

2.4.5 Intra-organisational Conflict

Intra-organisational conflict occurs between parties within an organisation. It can concern the structure of the organisation, the location of formal authority and the way in which jobs are designed. Hellriegel et al (1989:458–459) have identified four types of intra-organisational conflict: vertical conflict, horizontal conflict, line-staff conflict and role conflict.

- Vertical conflict: this occurs between parties at different levels within the organisation, for instance between an employee and a manager who is trying to retain overall authority. The employee may think that when management reduces his powers through micromanagement, they are infringing his right to control some aspect of the work.
- Horizontal conflict: this occurs between employees or units within the same hierarchical level. There are many potential causes of conflict, such as divergence of ideas or decisions being made that the whole unit or units on the same level do not agree with.
- Line-staff conflict: this occurs between support staff and other staff within a department. For example, staff engineers may specify the construction materials to be used, even though line engineers are ultimately responsibility for the output. Thus, a line engineer may feel that when staff engineers direct the tasks, it reduces his authority over the project.
- Role conflict: this occurs when there is an expectation that at least two different tasks will be performed within the same timeframe. For example, this may happen when an equipment technician is asked by his supervisor to install some equipment to perform soil operation works while the project manager asks him to carry out another task on the same day.

2.5 Conflict Cycle

Scholars seem to agree that each of these levels of conflict share a generic format (Wall and Callister, 1995). This format contains *causes* and a *core process* which itself has outcomes or effects, and finally *effects* which can be used as feedback to help in changing the *causes* (see Figure 2.2). Wall and Callister (1995) state that this conflict cycle takes place within a context (environment) and will flow through numerous interactions. They also describe the model as a general framework providing an indication of how the major pieces in a conflict puzzle fit together. Thus, this model is selected by the researcher, following Wall et al (1989) who proclaim that knowledge accumulates in a systematic manner, before describing and analysing particular conflicts in a reasonably common framework.

2.5.1 Other Reviews

Early research to be found in conflict literature tends to emphasise the competitive and destructive aspects of conflict (Deutsch, 1990). However, most conflicts can be reduced to a simple model of antecedents, processes and outcomes (Wall and Callister, 1995; Greenberg, 2003). Greenberg suggested three articles which make a noteworthy contribution to the model. First, Pondy (1967) outlined five stages of conflict: (a) latent conflict - underlying conditions which provide potential for conflict to occur (although perhaps hidden); (b) perceived conflict, when one or more parties become aware of a conflict; (c) felt conflict, where conflict becomes personalised (emotions related to stress and tension such as anger, hostility and frustration are present); (d) manifest conflict, where the conflict is enacted through behaviour; (e) conflict aftermath - the outcome of the conflict episode. Thomas (1978) focuses on dyadic conflict. He considered the conflict as a developing process which includes four stages: *perceptions, emotions, behaviour* and *outcomes*. Finally, Putman and Poole (1988) in a later article, examined three key characteristics of conflict which had been part of the earlier definitions provided by Pondy and Thomas. These defining characteristics were (a) incompatible goals, (b) interdependence, and (c) incompatible goals interaction. However, Greenberg in 2003 made changes to these three key characteristics of interaction, proposing instead a model consisting of: (a) interdependence, (b) perceived opposition, and (c) interaction, as revealed in Figure 2.2

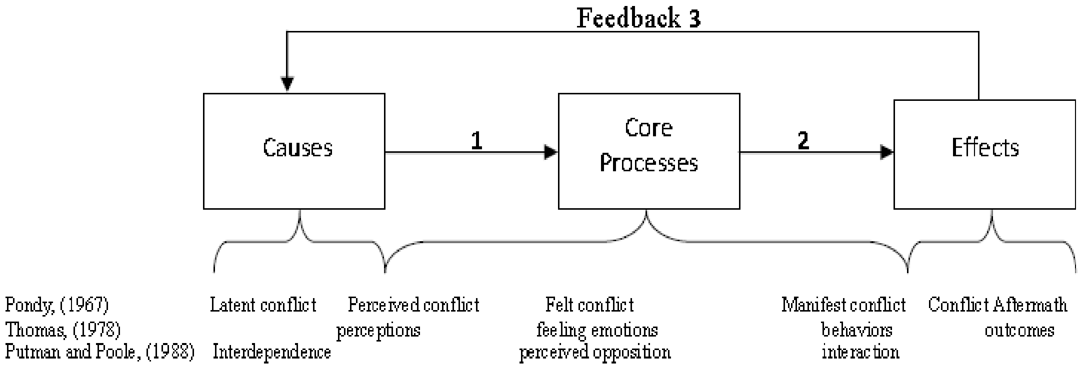


Figure 2.2: Conflict Cycle (Source: Greenberg, 2003:p270)

Pondy's (1967) approach used the term latent conflict to encapsulate the idea that due to certain antecedent conditions of conflict, real conflict or disagreement 'should' occur in other event(s) or occasion(s). However, the researcher would argue that this description of conflict helps to produce a more objective understanding of conflict situations since it promotes an in-depth appreciation of the conflict causes by describing the inter-relationships between the pre-conditions and the conflict events that are identified in an analysis of conflict. This approach is probably relevant when analysing conflict in construction projects as the activities involved are subject to a variety of influences and forces that are inter-related and cause inherent interdependencies. For example, conflict that has its antecedents in mistakes in the project briefing or during the design phase are likely to have serious harmful implications in cost and time during the project construction or on completion. Therefore, the researcher selected Pondy's approach to analyse the research data.

2.6 Antecedents of Conflict

Taking into account all the types of interaction in which divergent ideas and disagreements might emerge in the construction project context, Filley (1975) described nine conditions that specifically predispose organisations towards conflict, as follows:

1. Ambiguous roles, work boundaries, responsibility and authority
2. Inconsistency and/or goal incompatibility
3. Communication barriers or problems
4. Interdependence in tasks or activities

5. Differentiation or specialisation in organisations

6. Need for joint decision-making

7. Need for consensus

8. Behaviour regulation

9. Unresolved prior conflicts

Addressing these antecedents or latent conditions, Verma (1995) commented that they are a way of understanding conditions or situations leading to conflict, the potential results of conflict and the various methods of dealing with conflict in an organisation or project environment. Clearly, the latent conditions in relation to conflict are relevant to the research aim and objectives established in Chapter One (Section 1.4). Hence, each of one these nine latent conditions is now considered in the following sub-sections.

2.6.1 Ambiguous Roles, Work Boundaries, Responsibility and Authority

It is likely that in all projects and indeed, organisations, some overlapping of worker roles, and hence some ambiguity in terms of responsibilities, occurs, whether this be at the level of individual workers, units, departments, or divisions (Verma, 1995). Such a situation contributes to conflict in several ways. In the research literature this type of *role* problem has been identified as role conflict, and role ambiguity.

Firstly, role conflict "is what happens when a role generates incompatible expectations" and there are several reasons why it occurs (Rizzo, 1970:1555 cited in Andersen, 2008):

- the person's values are incompatible with those of the defined role;
- the person's time, resources and abilities fall short of those required by the role;
- the person performs many different roles requiring different types of behaviour;
- the organisation's expectations are incompatible with its rules and its policies may contradict its aspirations.

Secondly, role ambiguity means there is a "lack of clarity about the performance of a role" (Andersen, 2008:p167). This arises when unclear boundaries and descriptions cloud the authority structure, objectives, and assignment of responsibility.

The problem of role conflict and ambiguity has been documented in studies which correlate with other dysfunctional outcomes such as performance, commitment and dissatisfaction that are related to the job and work group relationship (Sell et al, 1981).

2.6.2 Inconsistency and/or Goal Incompatibility

Inconsistency or incompatible goals are among the frequent issues identified as sources of conflict in several works in the literature. Writers have described them as necessary antecedents or preconditions for the development of conflict but say nothing about perceived ability to engage in it (Schmidt et al, 1972; Szilagyi et al, 1987). In inter-group and inter-organisational settings, incompatibility exists when the goals of two parties are in direct opposition, meaning that one group may only accomplish its goals at the direct expense of the other group's aspirations (Jex and Britt, 2008). A common example of inconsistency or incompatible goals is seen between organisations dealing with marketing whose main goal is to satisfy customers by giving them the required product as and when they want it, whereas, those involved in manufacturing are attempting to produce the product as efficiently as possible and achieve economies of scale. This incompatibility or inconsistency can act as a provoker of genuine conflict. Likewise, in a construction project, goal incompatibility can appear between individuals or parties involved in the same mission and having similar purposes within a project in several aspects. For example, when considering costs, the project manager may perhaps be much more concerned with the quality control of building materials while the main contractor may be more interested in completing the task on or before the predetermined deadline, and may also be prepared to accept the standard of construction materials as long as they meet the client's requirements.

2.6.3 Communication Barriers or Problems

Semantic difficulties, misunderstandings and 'noise' in communication channels are all barriers which may impede communication. As a result, problems arising out of collaboration can stimulate misunderstanding and potential antecedents leading to conflict (Walton and Dutton, 1969; Furnham, 1997; Verma, 1996). The process of construction, especially in large projects, requires a high level of communication among all the professionals working together as well as with tradespeople during the whole life of the project. And as Verma (1996) has observed that the most prominent cause of misunderstandings and intense conflicts in most projects, is poor communication, it can be appreciated how important effective communication is for project success. However, with regard to project management practice, Wang and Anumba (2009) describe communication in large-scale construction projects as a very complex issue, which is extremely difficult to understand in its entirety. They attribute this complexity to three factors. Firstly, “there are many participants with different communication channels’, which makes the collection of all the relevant data almost impossible; secondly, “the lifecycle of large-scale construction projects is very long, and there are different tasks at different stages”; and thirdly, “each participant is not a person but an organisation” which means that each organisation involves different structures or departments communicating with the outside world through specific individuals and, as a result, gives more variables to construction project communications (Wang and Anumba, 2009:p 138).

These communication barriers can take place within and between project phases in various forms. They might occur, for instance, as a result of misinterpretation of the project owner’s requirements, design drawings or bills of quantity; there may be a misunderstanding of a particular project activity, e.g. a variation order or missed delivery data.

Finally, any communication barriers or problems concerning project individuals and involved parties would probably block or badly affect their efforts to exchange information effectively and at the right time, as well as hinder their attempts to explain their viewpoints concerning their needs and expectations in respect of achieving project success

2.6.4 Interdependence in Tasks or Activities

Interdependence is a relatively consistent theme especially in inter-group literature. It encompasses potential sources of intergroup conflict as it impacts on the interaction between people working together (Jex and Britt, 2008). It appears when the activity(s) or performance of one group affects the subsequent performance of the other group. In complex projects or organisations, the key teams or groups are expected to organise the different tasks which present the different sub-systems in which they are involved. Additionally, in order to achieve their goals, the groups must be *homogeneous* so that they can work with each other in pursuit of the overall organisational goal (Rahim, 2011). Essentially, this requires them to work as single unit, relying on one another for the duration of the specified activity.

Jex and Britt (2008) have examined the importance of the degree of such interdependence within these sub-systems, being concerned to establish how much each group depends on the other as the frequency of the interaction between the groups increases, since increased interaction heightens the potential for conflict(s) to appear. Blake and Mouton (1984:4-5) classify this as *interface conflict,* explaining why it is common in organisations by stating the following:

> "The potential for interface conflict is already present in the structure of modern organizations. Structures that combine similar work activities into functional groupings and separate them from others that are different are viewed as effective for maximizing effort and avoiding duplication. Interface conflict is likely to arise, however, when separated organizational components must reconnect and work together to achieve a goal."

Thomas (1967) identified three distinguishing forms of interdependence that have since, been the most frequently discussed, these being: Pooled interdependence, Sequential interdependence, and Reciprocal interdependence.

Pooled interdependence refers to a situation in which groups in the project are relatively (but not completely) independent of each other, but their pooled output contributes to the project as a whole. For example, in the construction of a building, brickwork and carpentry are two activities relatively dependent on each other in that they are both needed to make, for example, the final frame along with the building's doors and windows. Thus, when they are combined properly they can make proper windows and doors in a building but, if one group (e.g. brickwork) performs poorly it may have a negative impact on the other party.

Sequential interdependence relates to when the output(s) of one group serves the input(s) for another group.

Reciprocal interdependence exists between groups when they are involved in an activity where there is a series of continuous mutual exchanges (inputs and outputs) among them. This form of interdependence is evident during the preparation of the shop drawing for any construction project. This drawing or set of drawings is produced by several project personnel such as the contractor, supplier, manufacturer, sub-contractor and others. It contains pre-fabricated components (e.g. elevators, structural steel, trusses, windows, appliances, etc.), and explains the fabrication and/or installation of the items to the manufacturer's production or contractor's installation crews. However, any error or improper mutual exchange action committed by one of these personnel, especially during the construction phase, would probably result in a negative impact on the other(s) which would raise the potential for conflict.

2.6.5 Differentiation or Specialisation in an Organisation

Differentiation (specialisation) is defined as “the differences in cognitive and emotional orientation among the managers in different functional departments” (Lawrence and Lorsch, 1986) . It is stated by several authors such as Walton and Dutton (1969), Kezsbon et al (1989), and Willmott et al (2010), that the establishment of a condition leading to conflict can take place when people in organisations or project teams have different functional specialisations and become involved in the same project or activity. For example, a modern and highly-technological organisation is characterised by pools of specialists responsible for unique tasks. These *specialised* groups process their own perspective, language, and goals (Kezsbon et al, 1989). Functional specialisation requires people with specific knowledge background, experience and skills. Consequently, it can, in addition, have a further influence on the experts’ or department’s values, and attitudes and norms, as these functional differences might possibly promote different subcultures between or among specialised groups which ultimately lead to conflict (Willmott et al, 2010). Hellriegel and Slocum (2006) argue that the greater the number of ways in which groups see themselves as different from each other, the greater the potential for conflict between them.

2.6.6 Need for Joint Decision-making

In regard to complex projects, Vaaland and Håkansson (2003) suggest that there are at least two reasons which render joint decision-making crucial. Firstly, interdependence and links between the project’s activities means that these interdependent activities cannot be performed or completed unless by interference from other activities performed by other actors. March and Simon (1958) confirmed that “greater interdependency means greater urgency when it comes to joint decision making”.

The second reason is that mutual perceptions are required to make the appropriate decisions regarding such interdependent activities. The conditions of conflict are perhaps prevalent when unclear perceptions of a decision take place at different hierarchical levels or within different project groups (e.g. technical vs. management) working together to make a joint decision. The sensitivity of this issue is also illustrated by Vaaland and Håkansson (2003) through an example of the problem of violating 'matching hierarchies' addressed by Dahlgren and Søderlund (2001). This case discusses occurrences of unclear perceptions of decision patterns which lead to a dysfunctional conflict effect. This happens when, for example, an expert group at a lower hierarchical level on the supplier side becomes dissatisfied with a higher hierarchical level project manager on the buying side, or when problems or solutions are addressed directly to the project core team manager, bypassing the adjacent supplier project manager and going directly to top management in a large supplier organisation (Vaaland and Håkansson, 2003).

2.6.7 Need for Consensus

This is very similar to *the need for joint decision-making*. This condition of potential conflict arises when groups of divergent talents, background, norms and goals must reach consensus or agree on a course of action among themselves. In this situation, disagreements would be expected to occur and would probably be difficult to manage (Verma, 1995). However, the likelihood of creating conflict through any course of action would be less when group members are working together, and being more flexible and agreeable when making joint decisions. Forcing opinions from members of a group is another aspect that may create the conditions necessary for conflict which happens when, for example, a member of a powerful decision-making group attempts to force his or her opinions on others.

2.6.8 Behaviour Regulation

An organisation's rules, procedures and regulations can preserve natural parts of the project environment and restrict team members' actions, making them accountable to the same rules. This helps to prevent any perceived sense of favouritism. However, team players may feel they are in opposition to (or in 'conflict' with) every organisation they serve, especially if the management tries to impose or enforce its ideas (Kezsbon et al, 1989). Such situations may involve safety and security concerns and would lead to frustration and conflict. An example of this is the fact that most employers have rules prohibiting harassment, which deter conflict.

2.6.9 Unresolved Prior Conflicts

Schermerhorn (2010:344) asserts that "[w]hen conflicts go unresolved, they remain latent and often re-emerge in the future as the basis for conflicts over the same or related matters". It is a condition of conflict, according to Verma (1995) and others, that it tends not to dissipate but provoke and increase a tense atmosphere in such a way that it becomes even more destructive. Lorenz (1989) said it can have a tremendously negative impact on the parties themselves. In terms of relationships he states also that unresolved conflict leads to a shift away from each other and sometimes breaks up the relationship completely.

Sometimes one party is unwilling to commit to getting a conflict resolved. On this note, Verma (1995) states that such people can generate even more difficulties until perhaps a situation is reached whereby it is impossible for the team to work together in an organisation or project. As a result, any failure or lack of success in dealing with and managing a conflict properly would perhaps lead to more serious problems in the future.

2.7 Types of Conflict

2.7.1 Cognitive (*functional*) Conflict and Affective (*dysfunctional*) Conflict

The early conflict theorists focused on the negative effects of conflict (Brown, 1983; Hackman and Morris, 1975; Pondy, 1967; Wall and Callister, 1995). For example, in terms of group or team performance, conflict has been suggested to interfere with productivity and reduce satisfaction as it produces tension and antagonism which distracts team members from performing their tasks. There is empirical evidence which supports the notion that conflict has a negative effect on team productivity and satisfaction by a number of authors such as Gladstein (1984), Saavedra et al (1993), and Wall and Nolan (1986). However, Deutsch (1973), Coser (1956), Walton (1969), and many others, have recognised that low levels of conflict could be beneficial.

In this sense two types of conflict have been identified: *cognitive conflict* and *affective conflict.* Cognitive conflict mainly deals with task orientation and focuses on judgmental differences about how best to achieve common objectives. Therefore, it is generally perceived as *functional conflict* (Brehmer, 1976; Cosier and Rose, 1977; Jehn, 1992; Priem and Price, 1991; Riechen, 1952; Torrance, 1957). Affective conflict, on the other hand, deals with disagreement as personally perceived and this is generally perceived as *dysfunctional conflict* (Amason, 1996).

Smith (1992) argues that not all conflict is purely disadvantageous, and that some instances of it are inevitable and desirable. He surveyed the construction community as a whole and distinguished between conflicts that were functional and dysfunctional. Consequently, he views functional conflict as an inescapable part of the contractual system and sees it as necessary to achieve different parties' objectives, as indicated in his statement:

> "I consider functional conflict is essentially a construction community problem, when it is an inescapable consequence of our trading relationship. Dysfunctional conflict may have arisen if the actions of the parties have gone beyond what we may recognise as a functional conflict" (Smith, 1992:30).

Carnevale and Probst (1998) in their study, in which no conflict was induced, showed that participants in a situation in which they were able to anticipate a co-operative negotiation (cognitive conflict) with another individual were more flexible in their thinking and more creative in their problem solutions. However, cognitive flexibility and creative thinking decreased significantly when participants anticipated a competitive, hostile negotiation (affective conflict). In addition, research conducted by Schulz-Hardt et al (2002) showed that teams made better decisions when pre-discussion preferences were in disagreement rather than agreement.

Furthermore, the functional effects of cognitive conflict have been described by several authors. For instance, it was revealed that cognitive conflict should not adversely affect consensus and affective acceptance; in fact, it should enhance understanding (Amason, 1996). Schwieger and colleagues (1984, 1989) found this type of conflict encouraged evaluation of alternative underlying assumptions. It was also shown that it can enhance the commitment of team members as they debate their perspectives and exercise their voices in decision-making processes (Folger, 1977).

However, the crux of the dilemma is that this type of conflict as well as affective (dysfunctional) conflict can both be aroused by similar conditions. Thus, as teams stimulate cognitive conflict, they may inadvertently trigger affective conflict (De Dreu and Weingart, 2003). On this note, Amason and Schweiger (1994) argue that conflict can be both beneficial and detrimental because conflict appears in different forms. They reveal that while conflict can be very effective in terms of teams or groups working or strategic decisions, it is also a dangerous force as it can wreck a team's efforts to share information and reach consensus. These dysfunctional effects of affective conflict have been further pointed out by several authors. It has been shown that it can produce, for example, suspicion, distrust, and hostility among team members (Brehmer, 1976; Guetzkow and Gyr, 1954; Faulk, 1982). By so doing, affective conflict can obstruct the exchange of information between team members and erode the commitment that team members have for one another and for their decisions, and can result in team members avoiding one another or refusing to share information or producing poor decisions (De Dreu and Weingart, 2003).

Similarly, Capozzoli (1995) classified conflicts in terms of whether the outcome was constructive or destructive. Conflicts are constructive when people change and grow personally from the conflict; the conflict results in a solution to a problem; the involvement of everyone affected by the conflict is increased; the team becomes more cohesive. Conflicts are destructive when no decision is reached and the problem still exists; energy is diverted away from productive activities; the morale of the team members goes down; the team becomes divided.

Of course, managing conflict is easier said than done. Researchers have found that cognitive and affective conflict are often correlated (Cosier and Rose, 1977; Jehn, 1994; Pinkley, 1990), and little is known about how one can be encouraged and the other restrained (De Dreu and Weingart, 2003).

2.8 Stages in the Conflict Process

The five stages of a conflict episode are probably the most cited stages in inter-organisational conflict .These episodes can be thought of as a gradual escalation to a state of disorder and as mentioned above, consist of five stages: Latent-, perceived-, felt- and manifest-conflict, and conflict-aftermath (Pondy, 1967). Each of these is now discussed in relation to construction projects.

2.8.1 Latent Conflict

The latent condition is the first stage of Pondy's (1967) model of conflict, being described by Pondy as an underlying source of organizational conflict. He argued that in any organization certain conditions exist which provide the potential for conflict to occur, although they do not necessarily have to emerge, and sometimes despite their existence, they are not noticed by any member of any project group. Pondy (1967) condensed these latent conditions into three basic types that arise from the following sources:

(1) ***Competition forms the basis for conflict:*** it is concerned with conflict within interest groups when a discrepancy occurs between the aggregated demands of participants for resources which exceed the resources available to the organisation.

(2) ***Autonomy needs form the basis of conflict:*** this is when one party either seeks to exercise control over some activity that another party regards as his/her own province or seeks to insulate him/herself from such control; for example, the project team seeks to insulate itself from being controlled by the base organisation.

(3) ***Goal divergence is the source of conflict:*** this is when two parties are obliged to co-operate on a joint activity but are unable to reach a consensus on concerted action; for example, a divergence of goals can emerge through manpower rotation between supplier and the project team.

2.8.2 Perceived Conflict

This stage of the conflict is perhaps mostly related to the functional conflict. It occurs when one or more parties begin to recognise a conflict. The conflict perceived may or may not stem from an existing latent conflict. When there is no latent conflict, the perceived conflict clearly results from a misunderstanding of the various parties' true position, and as observed by Godwyn and Gittell (2012), that can be resolved by improving the communication between the parties. Sometimes the latent condition of conflict is present, but fails to reach a level sufficient to attract any awareness by the involved parties.

2.8.3 Felt Conflict

This is a conflict which becomes personalised as it is characterised by stressful emotions on the part of each interactant, such as tension, anger, hostility and frustration towards each other. The important difference between perceiving and feeling conflict is that with felt conflict, the parties are aware that there is serious disagreement between them over a particular issue, but at the same time this emotional disaffection does not affect the other party in any way. This conflict is more concerned with the dysfunctions of conflict.

2.8.4 Manifest Conflict

This is a conflict which is enacted through behaviour, and which takes hold until it reaches a state where the goals of at least one of the other parties are frustrated. Furthermore, it is a term reserved for the behaviour of at least one party who frustrates another in the pursuit of his/her (the other's) overt or covert goals, regardless of whether the action is deliberate, conscious or unintentional.

Any of the several varieties of this conflict-ridden behaviour are probably included. Perhaps the most obvious of these is open aggression. This conflict is much concerned with the dysfunctional aspect of conflict. Sometimes, especially in a complex project, the manifested conflict may follow a path towards negotiation, voluntary mediation with third party assistance, an arbitration tribunal, or finally, even a court decision. The interface between perceived conflict, felt conflict, and manifest conflict provides a point where most conflict resolution programmes are applied. It should be noted that the availability of such programmes may not be sufficient to prevent conflict from becoming manifest, but in some cases they can be, and certainly, they can be a major factor in determining the degree to which conflict becomes manifest, that is to say, they might not dissolve the conflict but they might well dilute it.

2.8.5 Conflict Aftermath

This is the final stage of Pondy's (1967) conflict process, representing the outcome of the conflict episode. Here the conflict is either genuinely resolved and so provides a basis for a more co-operative relationship between the parties or, on other hand, it is merely suppressed, remaining as an unresolved issue that will become the basis of future conflict as indicated by the broken line in Figure 2.3. This implies that an early conflict between project personnel and a specific supplier may have a detrimental effect later on in the same project, or in succeeding projects. Thus, this kind of a 'legacy' conflict is referred to as 'conflict aftermath'

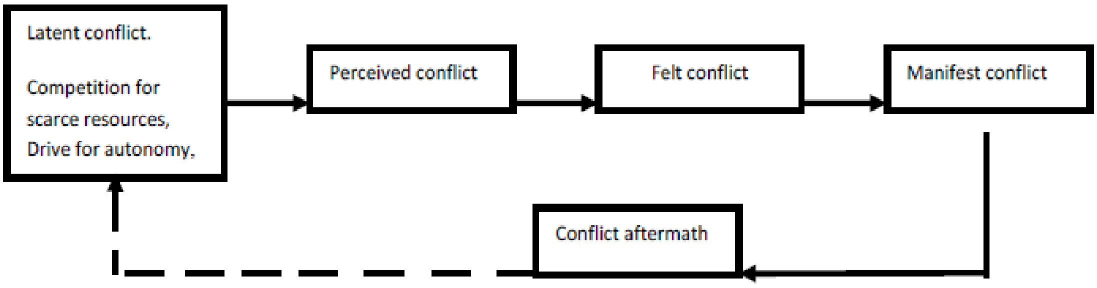


Figure 2.3: Pondy's (1967) Five Stages Model of Conflict

2.9 Conclusion

This chapter has considered the concept of conflict in more depth, and shown that it can have a negative impact on construction projects. It has the ability to destroy relationships between project parties and has other impacts on both project performance and cost, since it can prevent projects from progressing, cause delays, incur extra cost, and generally impair motivation. Consequently, it is incumbent upon key project participants, especially project managers, to resolve conflicts as soon as possible in order to achieve functional outcomes and minimise dysfunctional ones. Undoubtedly, the nature of the construction industry makes conflict inevitable, but in fact, irrespective of the context, there is always the possibility of conflict occurring when individuals or groups must work or interact with each other. The conflicts in themselves can have either positive or negative effects. With this in mind, two types of conflict have been identified: cognitive conflict and affective conflict. Cognitive conflict focuses on judgmental differences about how best to achieve common objectives and is, therefore, sometimes perceived as functional conflict, while affective conflict deals with disagreement as personally perceived by interested parties, and this is generally known as dysfunctional conflict.

The importance of effective project management, which implicitly demands a consideration of conflict management, and indeed a focus on the negative side of conflict, can be fully appreciated by recognising how it contributes to the identification of potentially harmful factors that result in conflict, but which if spotted beforehand, can be entirely prevented or at least minimised. Clearly, project managers who realise that preventing conflicts is as important as solving them, are likely to be effective. And for managers to be in a position to do this, they must be capable of analysing how and why conflict causes occur. There are shared generic formats (see Figure 2.2) which represent a systematic approach to the conflict cycle which has three elements, namely, *causes, core process* and *effects* which can be adopted to obtain the necessary strategies and techniques that ultimately help to prevent or minimise the destructive side of conflict. In addition, conflict *causes* can be analysed in terms of two things: first, at five levels namely, intra-personal, inter-personal, intra-group, intergroup, and intra-organisation. However, conflicts at the intra-organisation level can be examined based on various levels e.g. the individual, the team, and the department, and can also be classified as inter-personal, intra-group and inter-group. Secondly, Pondy's (1967) stages of conflict can be used to measure conflict intensity. They are: latent conflict - underlying conditions; perceived conflict, when one or more parties becomes aware of a conflict; felt conflict, where conflict becomes personalised; manifest conflict, where the conflict is enacted through behaviour; and conflict aftermath, the outcome of the conflict episode.

Although project participants can experience different types of conflict between them, there are nine antecedent conditions (Pondy's latent conditions) which have been identified as situations which predispose organisations, including construction projects, to potential conflict situations. These conditions are common in most organisations, especially those with matrix form structures. They are there to a greater or lesser extent, and key project participants, especially project managers, should realise their presence as they would want to improve the potential results of conflict and ascertain the methods of dealing with conflict in an organisational or project environment.

CHAPTER THREE

Conflict in Construction Projects

3.1 Introduction

As a follow-up to Chapter Two, this chapter provides a theoretical background to support the work in subsequent chapters that focuses on conflict in construction projects. There are two parts to the chapter. The first, comprising the sections between 3.2 and 3.2.2.3, presents tables detailing several conflict studies conducted in a construction project environment within the last two decades, as well as general attributions that can be made to show how the causes of conflict can be categorised in different ways. It also contains specific and useful insights into sources of conflict in relation to specific phases of a project life cycle as well as strategies for managing conflicts. However, for the purposes of this research, the discussion is developed according to the classical research of Thamhain and Wilemons (1975). The second part of the chapter, represented by those sections between 3.3 and 3.4, is concerned with managing conflict and, in particular, with the distinction made by Rahim (2002) between 'the amount of conflict' at various levels and 'styles of handling interpersonal conflict', which is essential for understanding the nature of conflict management. Each style of handling interpersonal conflict is also illustrated and briefly discussed. Finally, the question of how conflict occurs is discussed, taking into account current and past projects, as well as a consideration of what lessons can be learned in order to initiate improvements that can be incorporated into future projects of a similar nature.

3.2 Conflict in Project Management Research

3.2 .1 Categories of Conflict

In order to fully appreciate the concept of conflict a wide literature survey has been conducted by the researcher, using the key terms 'dispute', 'conflict' and 'claims' in the area of 'construction' and 'project' in order to discover the categories of construction conflict. The results were screened using the keywords 'type', 'area', 'category', 'factor', 'source', 'cause', 'root' and 'hand'. The literature search found many studies published within the last two decades pointing out the causes of conflict and these studies are summarised in Tables 3.1 and 3.2. Some of them were general in nature, that is to say, they did not address a specific context, while others focused on the construction industry in specific regions or national systems.

The difference between the various classification systems which present their own sets of potential causes of conflict as found in these studies, and any other project environment, can probably be attributed to several issues. Perhaps the most important ones are: firstly, the nature of the causes of conflict is analysed or discovered within a particular project environment; and secondly, designing a conflict classification system is subject, to a large extent, to the researcher's understanding or approach to developing that system. Both these reasons account for the variation in classification systems.

Table 3.1: Studies of Construction Project Conflict (general)

Conflict category (classification) system	**Context**	**Researcher(s)**
(1) Technical issues, (2) legal issues and (3) managerial issues.	Theoretical: analysis of the dispute as a chain of separate items.	Totterdill (1991)
(1)Change of scope procedure,(2) Change conditions, (3) Delay,(4) Disruption, (5) Acceleration, and (6) Termination	Theoretical	Hewitt et al (1991)
(1) Project uncertainty, (2) process problems, and (3) people issues.	Empirical: a report on dispute prevention and resolution.	Vorster (1993)
(1) Poor management, (2) adversarial culture, (3) poor communication, (4) inadequate design, (5) economic environment, (6) unrealistic tendering, (7) unrealistic client expectations, (8) influence of lawyers, (9) inadequate contract drafting, and (10) poor workmanship.	Empirical: the pilot study was carried out by circulating a questionnaire to clients, contractors, consulting engineers, architects and lawyers.	Jones (1994)
(1) Individual characteristics, (2) interpersonal factors, (a) perceptual interface, (b) communications, (c) behaviour and (d) structure, and (3) issues.	Theoretical: review of conflict literature.	Wall and Callister (1995)
Claims arising from (1) misunderstandings and (2) unpredictability.	Theoretical: general study.	Sykes (1996)
Three main sources: (1) economic, (2) value, and (3) power.	Theoretical: journal article, literature review.	Fisher (2000)
(1) Organisational issues, and (2) uncertainty.	Theoretical: literature review, case studies and interviews.	Peña-Mora et al (2004)

Table 3.2: Studies of Construction Project Conflict (regions or national systems)

Conflict category (classification) system	Context	Researcher(s)
(1) Acceleration, (2) restricted access, (3) weather/cold, and (4) increase in scope.	Empirical: survey of 24 construction claims investigated in Western Canada.	Semple et al (1993)
(1) Payment, (2) determination of the agreement, (3) time, (4) tort, and (5) the site and execution of the work.	Empirical: data obtained from 120 cases from Australia and the UK.	Watts and Scrivener (1993)
(1) Unrealistic expectations by the parties, (2) ambiguous contractual documents, (3) poor communication between project participants, (4) a lack of team spirit among participants, and (5) failure of participants to deal promptly with changes and unexpected conditions.	Empirical: survey carried out in Canada.	Bristow (1995)
(1) Changes as a result of design errors/ambiguities, (2) changes caused by ground conditions, (3) interfaces with utility lines, (4) prolonging the project, (5) delayed design information, (6) ambiguities in the contract document, (7) delayed possession of the site, (8) client changes, (9) changes as a result of other site conditions, and (10) billing errors.	Empirical: survey of 88 respondents' opinions about conflict categories and causes in the construction industry in Hong Kong.	Kumaraswamy (1998)
(1) Misunderstanding of contractual obligations, (2) legislation changes and subsequent regulations, (3) poor design documents, and (4) impact of local culture and social environment.	Theoretical: Middle East.	Daoud and Azzam (1999)
(1) Project uncertainty, (2) contractual problems, and (3) opportunistic behaviour.	Empirical: analysis of 24 construction disputes in the USA.	Mitropoulos and Howell (2001)
(1) Payment, (2) delays, (3) defects/quality concerns, and (4) professional negligence.	Empirical: survey of 233 construction mediations in the UK.	Brooker (2002)
(1) Failure to comply with payment provisions, (2) valuation of interim payments, (3) valuation of variations, (4) valuation of final account, (5) withholding monies, (6) loss and expense, (7) extension of	Empirical: study on the progress of statutory adjudication in the UK.	Kennedy (2005)

time, (8) defective work, (9) non-payment of professional fees, and (10) determination.		
(1) Site condition, (2) public interruptions, (3) changes of order, (4) design errors, (5) excessive contract quantity variation, and (6) double meaning of specifications.	Empirical: analysis of questionnaires sent to 124 professionals working for project owners, consultants and contractors in South Korea.	Acharya et al (2006)

Clearly, as shown in Tables 3.1 and 3.2, there are differences between the various conflict classification systems that have been proposed, but similarities among the findings of these studies have also emerged and even where the terminology is different, there are essential shared notions of phenomena that can be identified as causes of conflict, claims or disputes. For instance, *valuation of variations* (Kennedy, 2005) can be aligned with *failure of participants to deal promptly with changes* (Bristow, 1995); *contractual obligations* (Daoud and Azzam, 1999) may be aligned with *failure to comply with payment provisions* (Kennedy, 2005); and *design errors* (Acharya et al, 2006) could be aligned with *poor design documents* (Daoud and Azzam, 1999).

In addition, Tables 3.1 and 3.2 also demonstrate a considerable degree of ambiguity and sometimes discrepancies with regard to meaning of the constructs found within the literature. For instance, *unpredictability* constructed by Sykes (1996), appears to have a similar meaning to *uncertainty (*Peña-Mora et al, 2004) yet lacks any form of theoretical underpinning. Many of the conflict causes, on the contrary, have been identified as having some degree of specific meaning so that they can be anticipated, for example, *changes as a result of design errors/ambiguities* (Kumaraswamy, 1996) and *failure to comply with payment provisions* (Kennedy, 2005).

As a result of this brief examination of all these differences identified by researchers in the field, a conflict classification system has been devised. Clearly, this research project is not exceptional in that respect, but in formulating the classification, the researcher has developed a special system that is designed to respond to the particular causes of conflicts and to the type of project environment under investigation. For more details about how the conflict classification system was devised, the reader is referred to Chapter Four, Section 4.7.4.

3.2.2 The Work of Thamhain and Wilemon (1975)

Despite the fact that there are many research studies which have reported on the nature of conflict causes in general terms, very few of them have been dedicated to specifying conflict causes and how they are managed according to the specific phases of a project's life cycle. Thamhain and Wilemon (1975) made the point many years ago, that with this type of information available, project managers would be able to anticipate potential conflicts and understand their determinants at an early stage before actual conflict itself is triggered. Most antecedents of conflict situations (Pondy's latent conditions, as presented in Chapter Two) are identified as being usually is evidence at the earlier stages of the project life cycle (PLC) but they have also been associated with potential tangible conflict which can manifest itself elsewhere in the life cycle, including the later stages. Hence, an appreciation of these latent conditions, whilst valuable in providing managers with the tools and the wherewithal for developing strategic project management recommendations to make conflict phenomena preventable in the early stages, might not be the solution when conflict arises unexpectedly towards the end of a project. In order to provide clarify this hypothesis, the researcher addresses the issue in the following two sections by discussing one of the classic and early research studies of the project life cycle by Thamhain and Wilemon (1975) which also investigated various areas of conflict and disagreement in projects.

3.2.2.1 Sources of Conflict

Thamhain and Wilemon surveyed 100 project managers and engineers in a private manufacturing company, with the intention of identifying the sources of conflict, particularly dysfunctional conflict, and to measure their intensity over the four phases of a project's life cycle. Their results highlighted seven sources of conflict which were ranked according to intensity as follows:

Rank	Source
1	Schedules
2	Priorities
3	Human resources
4	Technical issues

5	Administrative procedures
6	Personality
7	Cost

Table 3.3 provides a more definitive illustration of the seven potential conflict sources.

In fact, research studies conducted later were found to yield similar results to those obtained by Thamhain and Wilemon (1975). For example, Eschmann and Lee (1977) conducted research in the military force area, and Posner (1986) undertook research in a wide variety of technology-oriented organisations, the results of which have a marked resemblance to those achieved by Thamhain and Wilemon. Posner (1986) collected data from 287 project managers through a nationwide series of seminars, adopting the same breakdown of project stages (Conceptual/Formation, Planning/build-up, Execution/Main programme, and Termination/Phaseout), and addressing the seven potential conflict sources.

Table 3.3: Seven Potential Conflict Sources in the Project Environment

Potential causes of conflict	**Characteristics**
Schedules	Disagreements that develop around the timing, sequencing and scheduling of project-related tasks.
Project priorities	Differing views by project participants over the importance of activities, tasks, and trade-offs that should be undertaken to achieve successful project completion.
Personnel (staff)	Conflicts that arise around the staffing of the project team personnel from other functional and staff support areas arising from the desire to use another department's personnel for project support.
Technical opinions and performance trade-offs	Conflicts that arise, particularly in the technology-oriented projects, technical issues, performance specifications, technical trade-offs, and the means to achieve performance.

Administrative procedures	Managerial and administrative–oriented conflicts that develop over how the project will be managed i.e. defining the project manager's reporting relationships, defining responsibilities, interface relationships, project scope, operational requirements , plans of execution, negotiated work agreements with other groups, and procedures for administrative support .
Cost	Conflict that develops over cost estimates from support areas regarding various project work breakdown packages; for example, the funds allocated to a functional support group might be perceived as insufficient for the support requested.
Personality	Disagreements that tend to centre on interpersonal differences rather than on 'technical' issues, conflicts that are 'ego-centered'.

Source: Thamhain and Wilemon (cited in Kezsbon et al, 1989:221)

However, despite the similarities between Posner's results and those of Thamhain and Wilemon as shown in Table 3.3, a slightly different ranking of sources of conflict over the project life cycle was evident in two places, and these variations are observable in Table 3.4.

Table 3.4: Ranking of the Seven Sources of Project Conflict

Rank	**Thamhain and Wilemon (1975)**	**Posner (1986)**
1	Schedules	Schedules
2	Priorities	Cost/budget
3	Personnel (staff)	Priorities
4	Technical issues/performance	Personnel (staff)
5	Administrative procedures	Technical issues/ performance

6	Personality	Personality
7	Cost/budget	Administrative procedures

As indicated in Table 3.4, the first major difference in the conflict patterns concerned costing, which was placed in final position in the Thamhain and Wilemon ranking, while Posner's ranking it was in second position. The second difference was in respect of administrative procedures which dropped in conflict intensity from fifth in the Thamhain and Wilemon ranking to the final position (seventh) in Posner's list. However, these differences between studies which represent both early classic research and more recent research, can be attributed to a variety of circumstances or changes which occurred between these studies. For instance, differences over costs might be attributed, as observed by Kezsbon et al (1989), to the change from a US-dominated market to an intensely competitive worldwide arena. This is in addition to the changes made by the government on contract pricing strategies, which reflected a move from a relatively flexible cost-plus basis to a more rigorous fixed-price approach that ultimately increased the pressure on cost issues. The diminished intensity of conflict over administrative procedures may be further attributed to the wider acceptance of project management strategies and related organisational forms (Kezsbon et al, 1989).

3.2.2.2 Conflict throughout the Project Lifecycle

It became evident that the sources and intensity of the conflicts experienced by project managers participating in the Thamhain and Wilemon research, varied according to the different stages in the project life cycle. For example, when a source of conflict exceeded other sources of conflict in a specific stage, this was seen to influence the project process and its prospects of success depending on its degree of negative impact on a particular project stage. The seven sources of conflict ranked over each of the four stages of the project life cycle, as revealed by Thamhain and Wilemons research are indicated in Figure 3.1.

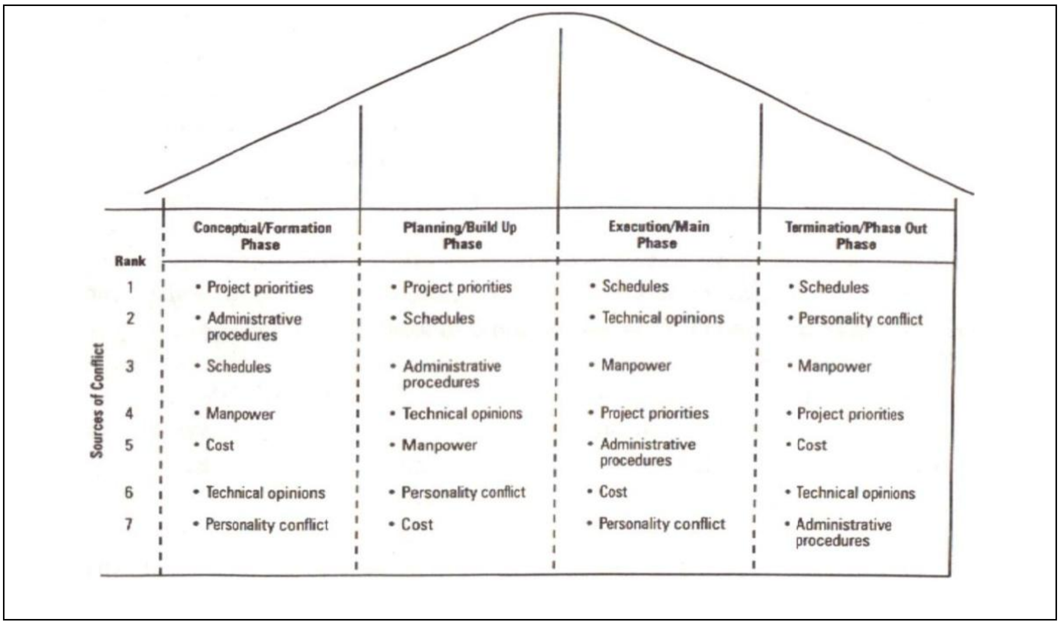


Figure 3.1: Sources of Conflict by Project Life Cycle Phases (Verma, 1996:103)

Certainly, the characteristics of each individual project stage play an essential role as each one of these stages involves different project performances, players, activities, and programmes, when compared with the others. Therefore, individual sources of conflict should be analysed over each stage to investigate the reasons behind particular conflicts, and thereby provide information which can be used to develop strategic management plans to minimise the negative impact of conflict.

In an attempt to provide more specific and useful insights into sources of conflict over each phase of the project life cycle, as well as into strategies for managing conflicts, the following sub-sections consider the phases in more depth.

3.2.2.2.1 Conceptual/Formation Phase

This phase as defined by Abdul-Kadir and Price (1995) as broad in concept, but is nonetheless, regarded as the main agenda around which the other phases are orchestrated, and hence, it is strategically important. Many researchers and practitioners have consistently declared that the successful sequencing of phases very much depends on the decisions made during this phase as it presents the greatest opportunity for good productivity on site (Kellogg et al, 1981). In the study by Thamhain and Wilemon (1975), three foremost sources of conflict were identified in this phase, these being in order of importance (as indicated in Figure 3.1), *project priorities, administrative procedure and schedule*. The other sources produced less conflict intensity and were ranked in the following order, *manpower, cost, technical opinions and personality conflict*.

Despite the fact that the project priorities are well-established at this stage and that the project personnel have no previous experience of the current project undertaking, conflicts tend to develop due to differing views between and within the personnel and staff over the establishment of project priorities in terms of what should be undertaken to achieve success. However, Thamhain and Wilemon (1975) state that to eliminate or minimise any destructive impact arising out of this problem, careful evaluation and planning should be undertaken as early as possible by project managers in order to manage the impact of their projects on the groups that support them.

The second source of conflict concerns issues associated with administrative procedures. Project activities and tasks, particularly the complex ones, are guided by several factors, which are summarised by Kerzner (1984) as:

• specific objectives based on a specification

• a specific start and completion date

• specific funding requirements

• the consumption of resources such as money, staff, outputs and equipment

To enable the above factors to be properly taken into account in planning and implementing the actions involved, clear administrative procedures articulating all the management issues concerning the project personnel and the duties of staff must be designed and clarified as early as possible in the project's life cycle. Thamhain and Wilemon suggested that the types of question to be asked and resolved at this point are: How will the project organisation be designed?; Who will the project manager report to?; What is the authority of the project manager?; Does the project manager have control over the manpower and material resources?; What reporting and communication channel will be used?; How does one establish schedules and performance specifications?

Schedules themselves represent another important source of conflict at this stage as there is a need to be aware of the potential for adjustments and/or reorientations which sometimes occur in order to accommodate a particular operating pattern that may already be in existence, and 'local' priorities in supporting departments. Project managers should show some flexibility in acknowledging any such adjustments, otherwise a potential conflict may develop within supporting groups especially when these groups are committed to other projects (Thamhain and Wilemon, 1975). Clearly, effective negotiation and communication skills are required at this point in order to eliminate or minimise any destructive conflict that might emerge as a result of the need to alter schedules.

3.2.2.2.2 Planning/Building up Phase

In fact, *project priorities, schedules and administrative procedure,* in that order, are important sources of conflict which can also take place during this phase, remaining as critical as they were in the previous phase, as the schedules issues grow in terms of the intensity of ranking from third to second place. As the projects progress through the building up phase, more enforcement is applied to the project plan, and major planning decisions are taken. For example, at the project conceptual phase where project schedule usually establishment, the project personnel and supporting groups may have ongoing disagreements about reaching a decision about the timeframe of the project schedule. However, in the building up phase, conflict can develop intensively as a result of major decisions being taken and schedules being enforced to secure the action plan.

Conflict over administrative procedures does, however, appear to decrease within the build-up phase of the project life cycle. Nonetheless, whilst this source of conflict has less weighting when compared with the conceptual phase, the ranking indicates its continuing magnitude and frequency. Any lack of clarity of administrative procedures within the conceptual phase contributes to this issue remaining a critical one in the building up phase. And if this situation occurs, it is imperative that attention be given to the development of a clearer specific design and development plan within the building up phase that properly clarifies the management issues related to the administrative procedures, such as the duties and responsibilities of project personnel and staff. However, Thamhain and Wilemon pointed out that early resolution of such issues is required to prevent this source of disagreement from reaching the advanced stages of the project life cycle.

Additionally, it is interesting to note that in this phase, conflict over technical issues appeared to rise to the fourth rank compared with the sixth rank obtained in the conceptual phase. Thamhain and Wilemon attributed this result to the fact that the supporting groups were not able to meet the technical requirements, ultimately affecting the project manager's cost and schedule objectives.

The survey by Thamhain and Wilemon pointed out that conflict over personality is difficult to handle, even when the conflict is minor and/or happens infrequently. Such conflict can actually be more disruptive and detrimental to the overall project compared with the other sources of conflict since it has the potential to remain, in not overtly, then under the surface, thereby clouding relationships, and the willingness of the parties concerned to work together. Thamhain and Wilemon also indicated that the lowest ranking conflict source in this phase was 'cost', a fact which was attributable to two primary reasons. Firstly, most project managers do not feel that the establishment of cost targets creates any conflict; and secondly, some projects are not sufficiently mature in this phase which makes conflict over cost between the project manager and those who support him/her, less likely to emerge.

3.2.2.2.3 Execution/Main Phase

In this phase, nearly all sources of conflict have different patterns of ranking order compared with the previous phases. Conflict over schedules is ranked the greatest, rising to its peak of overall intensity across the project life cycle. This occurs since the integration and interdependency of various project support groups at the execution phase is a difficult task, and sometimes one supporting group may affect another, especially if they are on a critical path of project progress which frequently gives rise to slippages in schedules. This also explains the emphasis on time rather than schedule changes in this stage of the project life cycle as this phase is concerned with 'management and maintenance' which make conflicts between project teams more intense when compared with the earlier phase, as the conflict develops due to changes in the 'establishment' of schedules.

Intensity of technical issues is another important source of conflict in this phase, attributed by Thamhain and Wilemon to two principal reasons. The first concerns the integration of various project sub-systems for the first time in the execution phase. It is often the case that complex projects required complicated integration processes but the lack of sub-system integration as well as poor technical performance, frequently triggers conflicts within or between the technical project groups. The second relates to the fact that the technical anomalies of a designed project component cannot always be eliminated, even in a prototype. Conflicts can generate more intensity if the prototype process in this phase is carried out by people who struggle to manage things properly and fail to achieve the project objectives.

Finally, during this phase, conflict over manpower appears as the third most important source of conflict which represents its highest level across the project life cycle. If support groups are providing more personnel to other projects, a more serious conflict may develop as a result of scarce human resource availability is juxtaposed with actual project requirements.

3.2.2.2.4 Termination/Phaseout Phase

As the project is completed, or becomes near to it, conflict over schedules and manpower continue to remain intense conflict sources, while conflict over technical issues is clearly reduced in comparison with its importance in the execution phase. In this phase another interesting shift happens in terms of conflict over personality issues, which moves from very low lower levels in the previous phases of the life cycle to become one of the top three sources in this phase (see Figure 3.1). Thamhain and Wilemon attribute this to two reasons. Firstly, project participants tend to become tense and concerned with assignments, and secondly, interpersonal relationships may become strained due to pressure on project participants to meet stringent deadlines, budgets, and performance specification and objectives.

Tight deadlines, in the form of ‘schedules’ which ranked as the most intense source of conflict due to the delays occurring during the execution phase, tends to carry over into the termination phase, as any previous delays become cumulative and impact on the project most severely in this final stage.

Disagreement over manpower resources is the third ranked source of conflict in the termination phase, and may well be related to the conflict over personality issues. It may develop due the fact that that competition is created for personnel during the critical phase-out stage, at which point in time, other projects may be starting up within the organisation, and priorities may find themselves clashing. Indeed, some personnel might leave a project prematurely due to prior commitments (especially where the time for the current project has over-run), and this will have the effect of delaying the achievement of the schedule of the current project. Or indeed, a person might simply leave because of a better opportunity elsewhere. In either case, the combined pressures brought about by problems related to scheduling, manpower, and personality can make a project more vulnerable to conflicts over priorities.

Conflicts over cost, technical, and administrative procedures are ranked the lowest in phase because most of the conflicts related to these issues have usually been resolved over the course of the life cyle, and hence, their weighting is less than the others. In the case of conflict arising over the cost, surprisingly, this does not emerge as a major cause of intense conflict. However, Thamhain and Wilemon observed that whilst the intensity of cost-associated conflict has less weight than other sources in this phase, it remains as one of the key evaluation measures when evaluating the overall performance of a project, and hence, the performance of project managers.

3.2.2.3 Strategies for Conflict Management

The discussions in Sections 3.2.2.1 and 3.2.2.2 would seem to justify the emphasis on the need to effectively manage conflict. Indeed, the potential effects of any sources of conflict identified by Thamhain and Wilemon, whether functional or dysfunctional, are in fact heightened or lessened dependent upon the project environment created by the key project participants as they attempt to manage conflict situations in an effective way. Kezsbon et al (1989) argue that allowing conflict situations to develop and then smothering them with a barrage of tactical and interpersonal skills and talent can be successful, but on the other hand, project teams must be well versed in potential conflict resolution strategies and constantly on the alert to act against eruptions of discord. In addition, they argue that key project participants can be in a better position to determine a more effective conflict management strategy as well to minimise the effects of conflict, if they aware of conflict intensities and their impact and can manage them through a preventive approach which ultimately encourages synergy and change. In this sense, for example, Verma (1998) explained the major differences between the two studies of Thamhain and Wilemon and Posner, which are clearly shown in Table 3.4. He addressed conflict over costs, moving it from seventh to second place; and conflict over administrative procedures dropped from fifth to final position due to a variety of changes in circumstances and ways of managing business, programmes, and projects which ultimately result in changes to the implemented project strategy. Verma (1998) argued that differences over costing can be attributed to tough global competition as well as the shift made by the US government over contract pricing strategy (from a flexible cost-plus basis to a more rigorous fixed-price approach) which has increased emphasis on cost issues. Similarly, the decreased intensity of conflict over procedures can be attributed to the wider acceptance of project management concepts, strategies, and techniques.

Table 3.5 provides some specific strategies for minimising the destructive effects of conflict based on the sources of conflict identified by Thamhain and Wilemon, 1975) and Posner (1986) as indicated by Kezsbon et al (1989:p227-229).

Table 3.5: Strategies for Minimising the Destructive Effects of Conflict

Project Life Cycle Phase	High-intensity conflict source	Strategies
Conceptual/Formation	Priorities	Jointly define and establish a mission; define a master project plan; develop first two levels of a WBS; define customer needs and solicit input.
	Cost	Generate preliminary product requirements; perform and communicate a detailed market analysis and study; determine initial cost estimates and requirements; determine resources and staffing allocation.
	Schedules	Establish a preliminary project schedule and fundamental, hard milestones; solicit preliminary input from organisations involved; identify risk areas and ongoing projects; document and distribute schedule information.
	Procedure	Establish project focal point and clearly delineate project administrative procedure; define roles and reporting relationships; establish appropriate project organisation.
Planning/Building up	Priorities	Provide feedback on previously established plans and feasibility; detail project scope and specifications, develop a detailed WBS with work packages; establish contingency plans.
	Schedules	Establish regular status review meetings; provide for periodic design reviews, pinpoint hard milestones; utilise PERT; identify critical path; track process.

	Staffing	Identify resource allocation through a detailed WBS; provide ongoing feedback; clarify roles and relationships; establish a responsibility chart.
Execution/Main	Schedules	Track progress and update schedule information on a regular basis; reward accomplishment or major milestones; identify possible slippage area early and take action.
	Priorities	Obtain early buy-in and consultation from main programme engineers and participants; establish a Change Control Board.
	Cost	Implement Earned Value Analysis (EVA); employ budgeting techniques that reflect life-cycle output needs.
	Technical issues	Provide for frequent testing and integration; schedule regular project review meetings.
Termination/Phaseout	Schedules	Detail installation and customer-training schedule; identify high-risk slippage areas; provide customer input to installation status.
	Cost	Track and monitor ongoing project costs.
	Personality	Maintain harmonious working relationships through the team, using conflict management strategies; identify new project resource needs.
	Staffing	Provide training for field and maintenance personnel, customers, etc.; identify and select support staff early.

Source: Kezsbon et al (1989:227-229).

3.3 Managing Conflict

The research that has been conducted in the area of the management of organisational conflict has followed two directions (Rahim, 2002). Some scholars have approached the issue from the perspective of measuring the amount or the intensity of the conflict at various levels (individuals, groups, inter-group and organisational), and have hence explored the sources of such conflicts. This group of researchers has concluded that dysfunctional conflicts must be minimised but that a moderate amount of functional conflict might be maintained to increase organisational conflict effectiveness by altering the source of conflict. Other researchers have aimed their research at investigating the various styles of handling interpersonal conflict among organisational participants, and the effects of these particular management techniques upon the problem-solving quality or achievement of social system objectives. However, Rahim (2002) makes the point that both these streams of research should be seen as complementary, since intelligence regarding ‘the amount of conflict’ at various levels, and the ‘styles of handling interpersonal conflict’ is essential for understanding the nature of conflict management. These two aspects are now discussed further.

3.3.1 The Amount of Conflict

As previously discussed, the amount of conflict is based on the concept of measuring the intensity of a conflict occurring in an organisation (project) at various levels. In an attempt to make such an assessment, researchers have used indications such as incompatibility, intention, annoyance, disputes, distrust, and disagreement as measuring tools that give an indication of the amount or intensity of a conflict at various levels. However, it should be noted that measurement of conflict is quite different in concept from styles of handling conflict (Rahim, 2002).

3.3.2 Styles of Handling Conflict

In previous research, project managers have not been clearly connected with experimental studies of conflict management. However, more recent studies have involved project managers in experimental research to ascertain the most effective conflict management strategy to handle interpersonal conflict. In earlier studies such as in the research of Thamhain and Wilemon (1975), project managers were asked to rank the most and the least favoured conflict resolution mode between themselves and their personnel at times of confrontation and compromise. A much later study by Barker et al (1988) in which 135 project team engineers were involved as project team members, aimed to identify the ‘most effective’ or ‘least effective’ conflict management approaches used by project managers in organisations with a matrix structure. Additionally, studies such as Kezsbom et al (1989), Drory and Amos (1997), and Barki and Hartwick (2001), have pursued the same themes. It is noticeable that most of these studies and others, have commonly adopted the five styles of conflict management presented by Thomas in 1976 to handle interpersonal conflict, these being: integrating, obliging, dominating, avoiding, and compromising.

Using a similar conceptualisation to that of Thomas (1976), and Blake and Mouton (1964), who were the first presenters of these five modes (styles), Rahim and Bonoma (1979) divided these styles into two dimensions in terms of self-interest and others. The first dimension relates to the degree (whether it is high or low) to which a person attempts to satisfy his or her own concerns. The second one relates to the degree (whether high or low) to which a person attempts to satisfy the concerns of others. Indeed the combination of these two dimensions marks five specific styles of handling conflict (Rahim, 2002).

An illustrative representation of the five styles of conflict management is presented in Figure 3.2 which combines the ideas of Thomas (1976) and Rahim and Bonoma (1979). The following sub-sections provide more clarity and explanation.

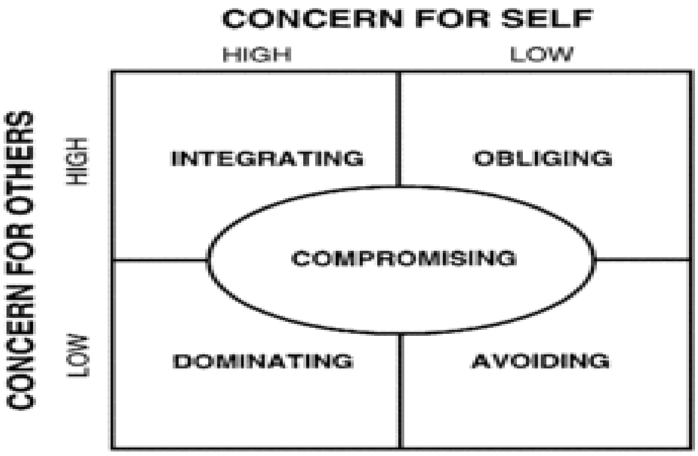


Figure 3.2: Styles of Handling Conflict

3.3.2.1 Integration (Collaboration)

This conflict management technique has a high concern both for oneself and for others. As Rahim (1992) states, it involves collaboration between, for example, project parties in several ways i.e. exchanging information, openness, and examining differences to bring about an acceptable solution which is agreed by both parties. In several studies this style has been divided into two elements: confrontation, and problem solving. Confrontation involves direct and open communication and has been described as encouraging creative solutions for problem-solving. In fact, it is said to generate alternatives and solutions to specific problems at hand. Therefore, as a group's work progresses, Kezsbon et al (1989) suggest that efforts would be expected to be made to modify parties' original views over time. They add that this collaborative approach constitutes a win-win situation for all parties although sometimes it becomes more difficult if consensus skills and commitment are not present. Rahim (2002) adds that this style has been found to be more effective than the others in terms of integrating the activities of different sub-systems. He also states that it is useful when issues are complex and that is is particularly appropriate for dealing with strategic issues relating to objectives and policies, long-term planning, and so on.

3.3.2.2 Obliging (Accommodating)

This style typifies a high concern for self and others. It reflects a high degree of co-operation, and is associated with attempts to play down differences between parties as much as possible and to emphasise the commonalities among them as a means of appeasing people's concerns. In other words, in such situations, an obliging person would sacrifice his or her own interests in order to satisfy another person's concerns. Obliging (accommodation) takes place when one party is prepared to concede an issue if it appears to be more important to the other party. Thus, this style of conflict handling is probably helpful in preserving the relationship between the parties over a long period of time.

3.3.2.3 Dominating (Competing)

This style of conflict handling has a greater concern for the self and a lower concern for others. It is also known as a win-lose approach and is associated with forcing certain behaviour to win one's position. This is the style of dominating people, or at least competing with them, i.e., a manager who seeks to fulfil his/her own objectives at any expense and, therefore, will probably ignore the other party's expectations or needs. On this note, Rahim (1992) explains that domineering individuals who have a strong desire to win at any cost, are likely to use their position or power to impose what they want on their subordinates and command their obedience.

In fact, this approach may be appropriate when certain conflict issues are trivial or when quick, decisive action is needed. Additionally, it can be appropriate when unpopular actions have to be confronted. This style is relevant for personnel or high level management who formulate strategies and policies (Rahim, 2002).

3.3.2.4 Avoiding (Withdrawal)

This style features low concern for oneself as well as for others. It has been associated with withdrawal, 'bucking the issue', and sidestepping situations. People who follow this style are prone to failing to satisfy their own objectives and expectations as well as those of the other party. Avoiding/withdrawal has also been described as an unconcerned attitude towards the issues or the parties involved in the conflict. In other words, individuals who use this style cannot normally acknowledge a problem openly, and deal with it as it should be dealt with (Rahim, 1992). This represents a short term strategy for handling conflict which neither deals directly with the conflict at hand nor builds any cohesion within a team (Kezsbom et al, 1989), and as an approach it is perhaps the least likely to overcome any conflicting issues or lead to project success.

3.3.2.5 Compromising (Negotiation)

This style of conflict handling reflects a balanced concern for both the self and for others. It is an approach where the parties follow a 'give-and-take' or sharing line, exchanging concessions to achieve a mutually acceptable decision for both parties. Compared with the other styles, the compromising party makes more concessions than the dominating party but not less than an obliging party. In addition, such a compromising party will also address problem issues more directly than an avoiding party but not more than an integrationist. Generally, this style produces sub-optimal results, which results from splitting differences. It can be used when the goals are mutually exclusive to both parties, when both sides are equally powerful. Heavy reliance on this style may produce dysfunctional conflict and is probably not appropriate when there is a complex problem requiring a problem-solving initiative.

3.4 Conflict as a Learning Process

Perhaps it can be said that any individual or group of people will benefit from a learning experience at the end of a particular phase of work in any aspect of life; this experience can be used as a springboard for further improvement in similar work situations in the future. Similarly, when a construction project is completed, project managers who have been involved in a project can conduct a constructive debriefing exercise to obtain useful information and develop their project management skills and knowledge which will help them to avoid problems in future projects and increase project team productivity. This may entail developing skills to help avoid or reduce conflict in future projects. Love et al (2008), for instance, declare that their causal model of the inter-dependencies and behaviour between key conflict variables as observed in previous projects, can contribute to ways of solving disputes so that learning takes place and improvements can be made to future projects. In addition, Cronin and Bezrukova (2006) have proposed a dynamic process conflict model which helps parties to obtain a better understanding of a conflict in relation to its history in terms of what has happened between the parties in order to enable them to learn from it and reduce any unpleasantness in subsequent conflicts. They express this idea of a learning process in the following statement:

> "We think that it is important to understand the effect of these by-products as they accumulate over time. Conflict is a dynamic process where subsequent actions are viewed in relation to what has already happened … To this point, we believe that as the learning/negative emotional by-products of conflict accumulate, it can affect the amount and usefulness of subsequent conflict. By examining the way learning and negative feelings result from conflict directly, and by taking into consideration conflicts that have occurred in the past, we believe we will be able to gain a clearer picture of the conditions under which conflict will be useful" (Cronin and Bezrukova, 2006:p4).

By their very nature and processes, conflicts are of different types and may have diverse outcomes whether during a project or after. For instance, in terms of a team's effectiveness, functional conflict could help to improve decision-making to produce better outcomes since conflict is considered to be a natural part of the process of decision-making in teams (Amason et al, 1995). In addition, it can increase commitment, cohesiveness, empathy and understanding, all of which might have a positive impact. On the other hand, dysfunctional conflict could produce poorer decisions and decrease team commitment, cohesiveness, empathy and the progress of the project (Amason et al, 1995).

Perhaps through observation, regular analysis and reviewing, people who wish to establish and perpetuate learning and improvement processes concerning a particular project activity, will be able to reduce the incidence of conflict over time; that is to say, as each conflict event brings feedback, information, or a particular experience, it should lead to an increase in people's understanding of, and motivation for, the need for change (Deutsch, 2006). It should be relevant to project managers who are interested in changing and improving project management practice in terms of avoidance or reduction of conflict in future projects. This may enable them to change their views or embrace new ideas in considering how to put better management of projects into practice. It also allows them to learn from each other and develop a greater ability to work together productively while, at the same time, reducing the possibility of future conflict (Cronin and Bezrukova, 2006).

3.5 Conclusion

This chapter has explored several perspectives of conflict research conducted within construction project environments. Based on a comprehensive review of the literature, as summarised in Tables 3.1 and 3.2, the chapter shows that causes of conflict and classifications of conflict, are various. And that they are also subject to the researcher's personal approach to developing a classification system that encapsulates as much information as possible. Hence, it is not appropriate to try to define a rigid classification system at the start of the research process, since it is recognised that any classificatory framework must leave room for the inclusion of unexpected causes of conflict that might arise within the construction project environment. It has also been shown that as the project life cycle evolves, the classifications of conflict cause can, and do, change. However, the broad approach of Thamhain and Wilemon (1975) has proved to be successful, and provided a sound foundation for further research, with its identification of seven main sources, and its attempts to measure their intensity throughout the different phases of the project life cycle. The advantage of this approach is that the detrimental effects of conflict in projects can be minimised, since project managers are prepared for the inevitable and armed with the necessary skills and understanding to anticipate potential conflicts and understand their determinants at an early stage before actual conflict is triggered. Moreover, knowledge of the changing importance of the antecedents of conflict during the evolution of the project life cycle enables project managers to visualise what might occur at some future stage of their projects and to engage in some long-range planning such that avoidable conflicts, are indeed, avoided.

In terms of managing conflict, project managers aspiring to manage any conflict effectively should have appropriate skills that are effective in dissolving conflict. In this respect, However, in terms of managing organizational (project) conflict, the work of Rahim (2002) has been informative, suggesting that two paths should be followed, these being: firstly, project managers should consider 'the amount of conflict' and try to evaluate this by measuring its intensity at various levels (individuals, groups, inter-group, and organizational). And secondly, they should heed 'the five styles of handling interpersonal conflict' which are essential for understanding the nature of conflict management. Finally, project managers can, themselves, recognise that they operate within a learning organisation, and take note of any conflict between project parties, past or present, such that they continually accumulate knowledge in the field, and become more expert at developing project management strategies for the avoidance or reduction of conflict.

CHAPTER FOUR

Research Methodology

4.1 Introduction

This chapter is concerned with the research methodology adopted in the research project. It provides examination and discussion that justify the research method used and the way in which the data were gathered from the construction industry in order to answer the research questions, and thereby achieve the research aim and objectives. As a starting point, the chapter examines the main philosophical positions to be considered in research methodology, namely those relating to ontology and epistemology, since ideas in this regard are fundamental in informing the design of the study. This discussion appears between sections 4.2 and 4.2.1.2. The nature of qualitative and quantitative approaches to research is then discussed. These approaches can best be considered as the basic belief system that guides and justifies the design of the research and specifically, the choices regarding the method used in a study. Sections 4.3 and 4.3.2 provide this discussion**.** Thereafter, the chapter presents the research design employed in this study. It indicates that the research is designed in two major stages, the first stage involving a definition of research questions, a literature review, and interview survey, and the second involving validation and testing of the questionnaire survey. Each of these research processes is introduced and explained between sections 4.4 and 4.4.1.4. Additionally, the chapter provides a justification for the choice of the research methods used, and this is found in section 4.5. Essentially, the chapter documents the research activities undertaken by the author, which include a number of exercises, these being: developing the main investigatory questionnaire survey, establishing contact with research respondents, sample selection, interviewing, and conducted a qualitative and quantitative (statistical) analysis of the data obtained. All of these processes are explained between sections 4.6 and 4.8.2. The chapter is offered a prelude to Chapter Five which presents the findings and discussion.

4.2 The Philosophy of Research Design

The relationship between knowledge and the process required in order to obtain that knowledge is an issue that has been hotly debated by philosophers for many years, not least because failure to explore philosophical issues such as this can significantly affect the quality of a research study. This kind of thinking is important to understand the relevance of any philosophical position in relation to a research question, research strategy, and method(s). In other words, it is crucial to the formulation of the research design (Easterby-Smith et al, 2002).

Easterby-Smith et al (2002) identify three reasons why it is important for a researcher to examine these philosophical issues, as follows:

Firstly, an appreciation of different philosophical stances can help the researcher to refine and specify the research methods to be used in a study, i.e. to clarify the overall research strategy to be used. This would include the type of evidence-gathering and its origin, the way in which such evidence is interpreted, and how it helps to answer the research questions posed.

Secondly, knowledge of research philosophy will enable and assist the researcher to evaluate different methodologies and methods, and to avoid the inappropriate use of techniques, and unnecessary work by identifying the limitations of particular approaches at an early stage.

Thirdly, an understanding of what philosophical positions are available may help the researcher to be creative and innovative in the selection and/or adaptation of methods that were previously outside his or her experience (Crossan, 2003).

Johnson et al (2007) observe that all research designs imply one or more philosophical positions, and that these various stances contain important assumptions that underpin the research strategy and the methods used, which will ultimately, be influenced by practical considerations. They argue that the various research orientations suggest a range of different ontological and epistemological choices and they recommended that the first decision a researcher needs to make concerns where to position him/herself among these possibilities. Consequently, a review of these different philosophical positions is now presented in order to indicate the major ways of thinking about research philosophy and how these positions are reflected in choices concerning research design.

4.2.1 Ontology and Epistemology

The term ontology is concerned with assumptions that we make about the nature of reality (Easterby-Smith et al, 2002). Philosophers often use this term synonymously with 'metaphysics'. Ontology is suggested as embodying "claims and assumptions that are made about the nature of social reality, claims about what exists, what it looks like, what units make it up and how these units interact with each other. In short, ontological assumptions are concerned with what we believe constitutes social reality" (Grix, 2002, cited in Blaikie, 2000: p 8).

On the other hand, the term epistemology is denoted as the nature of human knowledge and understanding that can possibly be acquired through different types of inquiry and alternative methods of investigation (Cohen, 2007). Easterby-Smith et al (1997) described epistemology as a general set of assumptions about the best way of inquiring into the nature of the world. In short, it is concerned with whether what is assumed to exist, can be known to exist.

Hence, ontology is about what knowledge it is possible to have, whilst epistemology is about how that knowledge becomes known.

4.2.1.1Objectivism vs. Constructionism

In ontological terms, two positions can be seen to exist in respect of social science research, and essentially, these are concerned with objectivism and constructionism. The latter term is often associated with the term 'subjectivism', since it arises from the subjective meanings that needed to be examined, and from which the researcher constructs meaning. It requires the investigation and interpretation of social behaviour using subjective measures, that is to say, the researcher's own experience. Saunders et al (2007) described the approach as one that explores the detail of the situation to understand the reality or the reality behind it. Basically, constructionist researchers conduct their explorations from their subjective positions and explain the phenomena they are investigating through their own social reality

Objectivism, on the other hand, is concerned with social entities that can be perceived without recourse to the researcher's own interpretive framework, that is to say, social phenomena exist irrespective of whether the researcher studies them or not (Saunders et al, 2007). An example of objectivist research is a study of the management structure within an organisation, since this has an external reality which is separate from the managers who inhabit that reality.

Cronje (2006:p388, quoting from Jonassen, 1991) observes that “[t]he two theories are generally described as polar extremes on a continuum from externally mediated reality (Objectivism) to internally mediated reality (constructivism)”. This relationship is shown in Figure 4.1, which depicts the continuum with constructivism to the extreme left and objectivism to the extreme right.

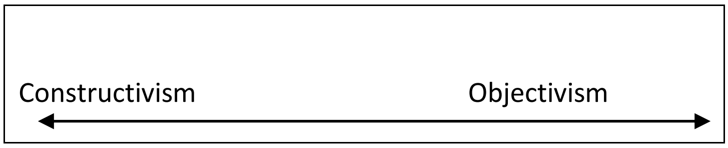


Figure 4.1: The Constructivism-Objectivism Continuum

From the figure it can be understood that approaches can vary in their degree of constructivism and or objectivism.

4.2.1.2 Positivism vs. Social Constructionism (Interpretivism)

In epistemological terms, there are two main positions that it is possible to take in social science research, these being positivism and social constructionism, or interpretivism as this tradition is sometimes called.

Positivists believe that the social world exists externally, and consequently, that events within it are capable of being, and should be, measured through objective methods, rather than being inferred subjectively though feeling, reflection or perception. Smith (1998, p77) describe the positivist approach in social science, as one that assumes “things can studied as hard facts and the relationship between these facts can be established as scientific laws. For positivists, such as laws have the status of truth and social objects can be studied in much the same way as natural objects”.

Hence, it can be argued that the basic reasoning of positivism assumes that an objective reality exists which is independent of human behaviour, and is therefore, not a creation of the human mind. This is similar to the argument advanced by physical and natural scientists who are concerned with facts rather than impressions or beliefs.

The key idea of social constructionism is that reality is investigated by reference to people's experience, rather than to external causes and fundamental laws that might be found to explain behaviour (Easterby-Smith et al, 2002). Social constructionism is focused on what people individually and collectively are thinking or feeling, and therefore, the methods associated with research that is underpinned by this belief, are referred to as 'interpretive methods'. Many researchers believe that this approach provides another aspect or dimension of reality. Human behaviour, such as feeling or thinking, extends beyond the scope of positivism, and consequently, some researchers refer to social constructionism as 'post- positivism'. Crossan (2003) argues that the tradition involved a search for 'warranted assertibility', that is to say, evidence that is valid and soundproof, the existence of phenomena.

Easterby-Smith et al (2002) clarify how adherence to these different views is reflected in the way researchers approach their investigations. For example, in a study of managerial stress, the social constructionist would be interested to find aspects of stress in work, and his/her data collection strategies would involve talking with some managers or attempting to gather stories about stressful events. In contrast, the positivist researcher would begin with the assumption that the occupational stress exists and then try to measure that stress by asking large numbers of managers to relate their stress experiences to external causes. From these examples, it can be understood that positivism adopts a quantitative approach to investigate a phenomenon whereas social constructionism aims to describe phenomena from a qualitative perspective, which allows for in-depth investigation. Each of the two methodological approaches has its own advantages and limitations which are discussed in the following sections.

4.3 Qualitative and Quantitative Research Approaches

As already intimated, the different philosophical positions have their own methodologies, some favouring qualitative, and others, quantitative approaches. It is important to recognise that the research aim(s) and objectives should determine which approach is the most suitable, in which respect, Johnson et al (2007:p56) state that:

> "Those interested in developing theories that relate particular strategic practices to outcomes in a positivist tradition will tend to prefer a comparative case study approach and a method of summarizing data ... and will therefore tend to favour breadth over depth in qualitative data collection and analysis. In contrast, those interested in

> participants' interpretations will tend to prefer ethnography or in-depth interviewing as a research strategy and will be looking for depth, detail and nuance rather than convergence on well-defined constructs".

In the following two sections, the differences between these approaches are illustrated.

4.3.1 Qualitative Approach (Induction Approach)

This approach is concerned with obtaining individuals' attitudes, motivations and behaviour in respect of the subject of the research. It offers detailed descriptive explanations of individuals' perceptions, attitudes, beliefs, feelings, and behaviour, and implicitly, it reveals the meanings and interpretations they give to particular events (Hakim, 1989). Fellows and Liu (2003, p28) described this approach by stating:

> "Qualitative approach seeks to insights and understand people's perception of 'the World- weather as individuals or groups. In the qualitative approach, the beliefs, understandings, opinions, views, etc. of people are investigated - the data gathered may be unstructured, at least in their 'raw'form, but will tend to be detailed, and hence 'rich' in content and scope. Analyses of such data tend to be considerably more difficult than with quantitative data, often requiring a lot of filtering, sorting and other 'manipulation' to make them suitable for analytical techniques. Clearly, a variety of external environmental variables are likely to impact on the data and results and the researchers are likely to be intimately involved in all stages of the work in a more active way than usually is acceptable in quantitative studies".

Hence, it can be seen that the approach draws on the principles associated with social science rather than natural science. On the basis of this principle, Bryman and Becker (2004) pointed out four main issues and preoccupations of qualitative researchers that can be reviewed as stemming from this commitment. These issues were described as being: a focus on the actor's meaning and description, the context, the process, and flexibility. In addition they also pointed out two important features that can indicate the distinction from quantitative research. Firstly, qualitative research typically involves an inductive approach to the relationship between theory and research; and secondly, it adopts a constructionist position with respect to the nature of social research, which means that social phenomena and reality are considered as the results of people's social interactions, and are interpreted in this light. Furthermore, from its epistemological roots, social constructionism can investigate human knowledge and understanding through different inquiries and interpretive methods.

In respect of methods, Schutt (2006:19) describes qualitative methods in the following terms:

> "Methods rely on written or spoken words or observation that do not have a direct numerical interpretation and typically involve exploratory research questions, inductive reasoning, an orientation of social context, and the meanings attached by participants to events to their lives".

The great strength of qualitative research is that it allows for individuals to be interviewed in depth, and for the data they provide to be properly validated by the detail they offer. Hence, the data can be taken as a true, correct, and complete view of their experience. On the other hand, the interactive and participatory nature of qualitative research, can also be considered as weaknesses since there is potential for bias in interpretation. Crossan (2003:p53, citing Mays and Pope, 1995), summarises the main shortcomings of the qualitative approach as:

> "Firstly, that qualitative research is merely an assembly of anecdote and personal impressions, strongly subject to researcher bias; secondly, it is argued that qualitative research lacks reproducibility – the research is so personal to the researcher that there is no guarantee that a different researcher would not come to radically different conclusions; and, finally, qualitative research is criticised for lacking generalisability".

4.3.2 Quantitative Approach (Deduction Approach)

The quantitative approach is derived from the scientific method used in the natural sciences. It is an objective, formal, systematic process in which numerical data are used to quantify or measure phenomena and produce findings. Quantitative methodologies test a theory deductively from existing knowledge, through developing hypothesised relationships and proposed outcomes. In this respect, Bryman and Becker (2004) confirm that quantitative researchers begin with an idea (usually articulated as a hypothesis), and then, through measurement, generate data and, by deduction, allow a conclusion to be drawn.

This approach contrasts with qualitative research, in which the investigators are guided by certain ideas, perspectives, or hunches regarding the subject to be examined, and which then allow them to develop a theory inductively (Carr, 1994).

Bryman and Becker (2004) pointed out four main issues and preoccupations of quantitative researchers that can be considered as stemming from the commitment to objectivity. These issues are described as being: measurement, causality, generalisation, and replication. They also highlighted two important features that can indicate the distinction between this approach and qualitative research. Firstly, quantitative studies typically involve a deductive approach to the relationship between theory and research; and secondly, they adopt an objective position with respect to the nature of social phenomena and reality which they believe to be external to social actors.

The positivist underpinnings derived from the epistemological position, direct quantitative research to examine existing social reality independently of human actions and behaviour. Furthermore, Carr (1994) observed that quantitative studies demand a random sample which should be representative of the population being studied, since this approach can be relied upon to develop propositions that can then be generalised to the larger population. Carr (1994) perceives the ability to increase the likelihood of generalisation, which comes from random sampling, as a distinct advantage of the quantitative approach, and observes that the approach is considered to be more reliable in providing information about the relationship between the variables under investigation, and in enabling prediction and control over future outcomes. On the other hand, the disadvantage, and hence, a weakness of the quantitative approach, is that random selection is time-consuming, with the result that many studies use more easily obtained opportunistic samples. The consequence of that is the chance that samples become self-selecting, and then arguments about greater generalisation become less convincing.

The differences between quantitative and qualitative research are summarised by Bryman and Becker (2004) in Table 4.1.

Table 4.1: Comparisons between Quantitative and Qualitative Research (Bryman and Becker, 2004)

	Quantitative	Qualitative
Principal orientation to the role of theory in relation to research	Deductive; testing of theory	Inductive; generating of theory

Epistemological orientation	Natural science model, in particular positivism	Interpretivism
Ontological orientation	Objectivism	Constructivism

4.4 Research Design

Nachmias and Nachmias (1993) describe the research design as the programme that guides the investigator in the process of collecting, analysing, and interpreting observations. Yin (2003) considers research design as an action plan for getting from here to there. In formulating that action plan, a number of design alternatives present themselves for consideration. And even with one design, it is possible that several different data collection methods might be suitable. In this respect, Walliman (2005) emphasises that there may be several research methods that could justifiably be applied to different aspects of the same research study, each enabling a different aspect of the problem to be investigated and analysed. Consequently, in terms of the current research project, with the research aim and objectives in mind, the researcher has reviewed several options in order to decide upon the most appropriate research design and data collection methods. The following sub-sections present the information relating to the research design.

4.4.1 Research Methods

As indicated in Chapter One (Section 1.4), this study aims to explore the causes of conflict experienced in large architectural building projects in Saudi Arabia, with a view to formulating a causal model that explains the dynamics between the latent conditions and actual conflict. In order to pursue this aim, the researcher has broadly designed the study so that it has two stages. The first is essentially concerned with collecting information and data, and is involved with generating theory (induction). The intention in this stage is to review the existing literature in the field in order to prepare for the empirical work conducted in Saudi Arabia, and then to establish the causes of conflict in Saudi Arabian public sector architectural projects and to learn how they develop into actual conflict between the key project parties. Additionally, this stage explores some project management strategies for preventing or reducing the incidence and impact of conflict. Three different activities are included in this stage, these being:

i. The formulation of the research questions;
ii. The review of the literature review;
iii. The administration of a survey through interviews.

The second stage, involves the validation and testing of the data collected, and essentially the proposed theory. In this stage the survey data (on the causes of conflict) gathered through the interviews are validated with the providers of that data, and the recommendations concluded by the researcher from the survey data are tested for their appropriateness with a suitable and large sample of practitioners.. This involves two activities, these being:

iv. Validation of the questionnaire survey data;

v. Testing the suitability of the recommendations emerging from the questionnaire survey.

The research design is shown in Figure 4.2.

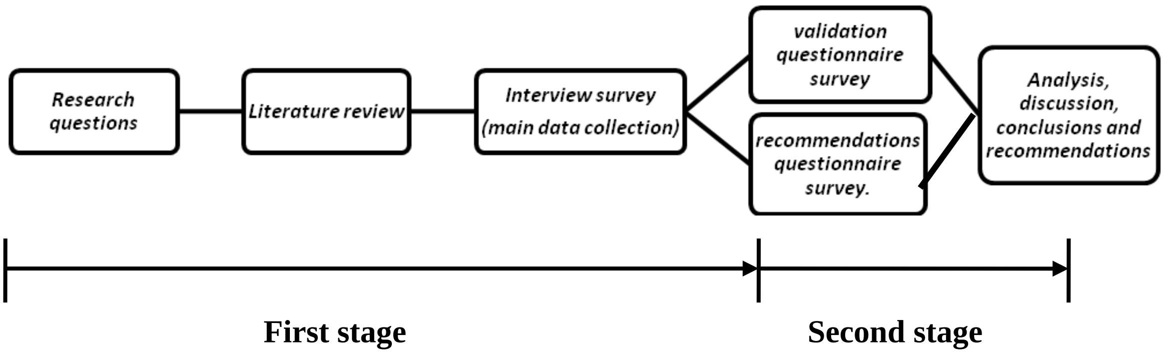


Figure 4.2: The Research Design

4.4.1.1 Research Questions

Kotler et al (2006) affirmed that often, the most challenging aspect of the research process is defining the research problem and objectives. One this task has been completed, however, the precise information, and the material needed, can be determined, and this will assist in suggesting a hypothesis, and in concentrating the study on a limited set of questions (Kotler et al (2006). In order to achieve the research objectives of this study, and to ensure that the most appropriate research design is chosen, three key research questions are formulated as follows:

- What are the causes of conflict within the large architectural building projects in the Saudi Arabian public sector?

- How do these conflict causes encourage the incidence of conflict between key project parties?

- What project management strategies can be implemented at the start of a building project to prevent or at least reduce the potential incidence of conflicts?

4.4.1.2 Literature Review

A review of the relevant literature has been conducted to generate a picture of the knowledge and understanding that currently exists in areas related to the study. This includes a review of relevant research studies, as well as theoretical contributions in the literature. The key areas covered include: the concept of conflict, the nature of the construction industry from the conflict perspective, levels of conflict, conflict cycle, antecedents of conflict, functional and dysfunctional conflict, stages in the conflict process, conflict in project management research, sources of conflict, managing conflict, and other associated topics all of which are discussed in Chapters One, Two and Three. As sources of information, scientific journals, textbooks, conference proceedings, official and government reports, and web homepages, have been consulted by the researcher. There are two main aims of the literature review, these being:

i. To explore relevant research literature produced by other scholars and researchers in order to use this as the theoretical underpinnings for the current study;

ii. To enable the researcher to precisely specify the research questions and propositions, which as stated by Yin (2003), is a key element of research that leads into the selection of an appropriate unit of analysis.

4.4.1.3 Interview Survey

It was decided to gather empirical evidence by conducting a survey among appropriate individuals, but to undertake the survey using the interview method, and to consider this as a qualitative approach to data collection. The idea was to generate qualitative data that would enable the identification of a list of conflict issues that are experienced in Saudi Arabian public sector architectural projects, and at the same time bring forward suggestions relating to project management strategies for preventing or reducing the incidence (and hence, the negative impact) of these conflicts. A key justification for this particular method lies in the fact that no previous study has been conducted in this area, nor is there any evidence that the existing conflict literature (derived from other countries and cultural contexts) is of relevance to the Saudi Arabia architectural project industry.

Within this stage of the research process, 30 interviews were conducted with a sample of key personnel in the industry, namely; client representatives, design consultants, main contractors, and sub-contractors. The aim of the interviews was both to explore new findings in terms of conflict causes, and to determine what recommendations might be made in respect of project management strategies to avoid or reduce these causes. Using the data, a process of inductive reasoning was anticipated. Indeed, Greenhalgh and Taylor (2007) state that qualitative research begins with an intention to explore a particular area, oversees the collection of 'data' (observations and interviews) and generates ideas and hypotheses from these data largely through what is known as 'inductive reasoning'. The method chosen is, therefore, properly justified as one that is suitable for the purpose.

4.4.1.3.1 Methods of Interview Survey

Single interviews (as opposed to focus group interviews) can be conducted in two ways, on a face-to-face basis, and on the telephone. As both of these approaches have been used in the study, the advantages and disadvantages of each are now considered.

The telephone has long been used for local and long-distance interviews with specialised and non-specialised populations, and in large and small surveys using schedules of varying length and complexity, and since that observation was made by Rogers in 1976, the whole world of telecommunications has advanced, which means that no matter where an interviewee might be situated geographically, it is easy to complete interviews. The method represents a direct and easy way for the interviewer to ask prepared questions and for the respondent to answer them, and further information can be gathered in a consistent way from the selected respondents. Being interested in determining the usefulness of this method in contrast to other interviewing strategies, Rogers (1976) conducted an experiment in which he measured the effects of a range of alternatives, examining the quality of responses and on-field performance. The results indicated that the quality of data obtained by telephone is comparable to that obtained by interviews in person.

Comparing the advantages and disadvantages of telephone and face-to-face interview methods helped the researcher to make his decision with confidence.

The advantages of the telephone interview over the face-to-face interview were highlighted by Freyand and Oishi (1995). They argued that the telephone interview is an increasingly popular choice because it is easier, more cost efficient, and obviously data collection is faster. They also noted that when used to survey the general population, telephone surveys have the advantage of excellent sample coverage and a generally high response rate. In addition, a survey can be conducted through centralised calling units that offer specially equipped calling stations and telephone equipment, such as recording equipment, rather than calling homes or private offices.

On the other hand, face-to-face interviews have advantages over telephone interviews in terms of fewer limitations on the types and the length of questioning, and in the ability to use visual aids. Additionally, this type of interview can be conducted in the most suitable location for different respondents (e.g. their home, workplace, school, or survey office) and is regarded by researchers as one of the best ways of obtaining detailed data. Moreover, face-to-face interviews provide the researcher with a guarantee that the participant is the individual s/he requires for the study, whereas the telephone does not assure this. Nonetheless, the face-to-face interview technique is hampered by higher field costs, an increasing resistance on the part of respondents to invite strangers into their homes, and difficulty in obtaining permission from management to conduct interviews in the workplace. Without doubt, telephone interviewing has become commonplace as a data collection method, offering cost reduction and speed without sacrificing the quality of the survey.

However, appreciating the advantages of both methods, and accepting that in some particular circumstances, one approach might be better than another, the researcher decided to adopt both telephone and face-to-face interviewing as a means of generating the greatest amount of co-operation, and data.

4.4.1.4 Questionnaire Survey

The second stage of the research design which is concerned with the validation and testing of the outcomes obtained from the first stage, relied on a quantitative approach, in which a questionnaire was used to confirm the validity of the interview data, and another questionnaire was used to confirm the suitability of recommendations formulated by the researcher.

Essentially, the first test was for internal validity of the data generated from the interview exercise, and this test is referred to as the validation survey questionnaire. Its intention was to provide the interviewees with the opportunity to assess the correctness of the researcher's interpretation of the data they had provided during the interviews, and to correct any misunderstandings on the part of the researcher. Hence, it was administered purely with the interviewees involved in the first stage of the research design.

The second test, called the recommendation survey test, was used to establish external validity in as much as the strategic project management data recommendations for strategy) generated by the interviewees, was presented to practitioners who had not previously been involved in the study, to determine whether they believed there was the potential for implementation. Additionally, this test was considered to enhance the generalisability of the conclusions drawn to other contexts (Miles and Huberman, 1994). In this test, a four point rating system was used to establish degrees of agreement coming from a random sample of key construction project practitioners (project owner or client representative, architects/consultant service providers, main contractors, sub-contractors, and other appropriate personnel such as quantity surveyors). The results produced by this questionnaire survey were analysed using SPSS statistical methods.

4.5 Justification for the Research Approach

As discussed in sections 4.3.1 and 4.3.2, different epistemological and ontological assumptions are reflected in different approaches to research. And as subsequently discussed, both qualitative and quantitative approaches are valid in these differing approaches.

Using both approaches, the researcher can secure in-depth data from the research sample, and subsequently be able to understand the phenomena under consideration by presenting the results obtained as a theory within a framework, or as a hypothesis to be tested. In the case of this study, the empirical exercise of securing data enables the researcher to obtain both qualitative and quantitative information regarding the existing conflict situation within the Saudi Arabian architectural building industry, and the ways in which practitioners believe this can be alleviated. This mixed methods approach is believed to allow the researcher to build a holistic view of the conflict situation, to expose 'generative mechanisms' to answer the questions of conflict causation, to trace the origins of the mechanisms that cause conflict, and to formulate recommendations for good project management practice in the area of conflict. Hence, using the qualitative approach, the study ensures that it achieves one of the research objectives concerned with how and why conflicts arise within the precise context identified, using the quantitative approach it ensures that the qualitative data is ratified and shown to have validity in the particular context of the study.

However, there is a sequel and complement to this section in Chapter six (Data Validation) which provides an explanation of the how the Validation Questionnaire was designed, and the way in which the data from the Validation Survey was processed and analysed. This is in addition to a complement in Chapter Eight (Recommendation Test for Construction Projects) which provides an explanation of how the recommendations arising from the interviewees were tested, and gives details of how the survey was designed and conducted.

4.6 The Methodology in Practice

This section explains how the data collection, processing and analysis in terms of the main research methodology process have been conducted. Figure 4.3 offers a schematic representation of the full research process.

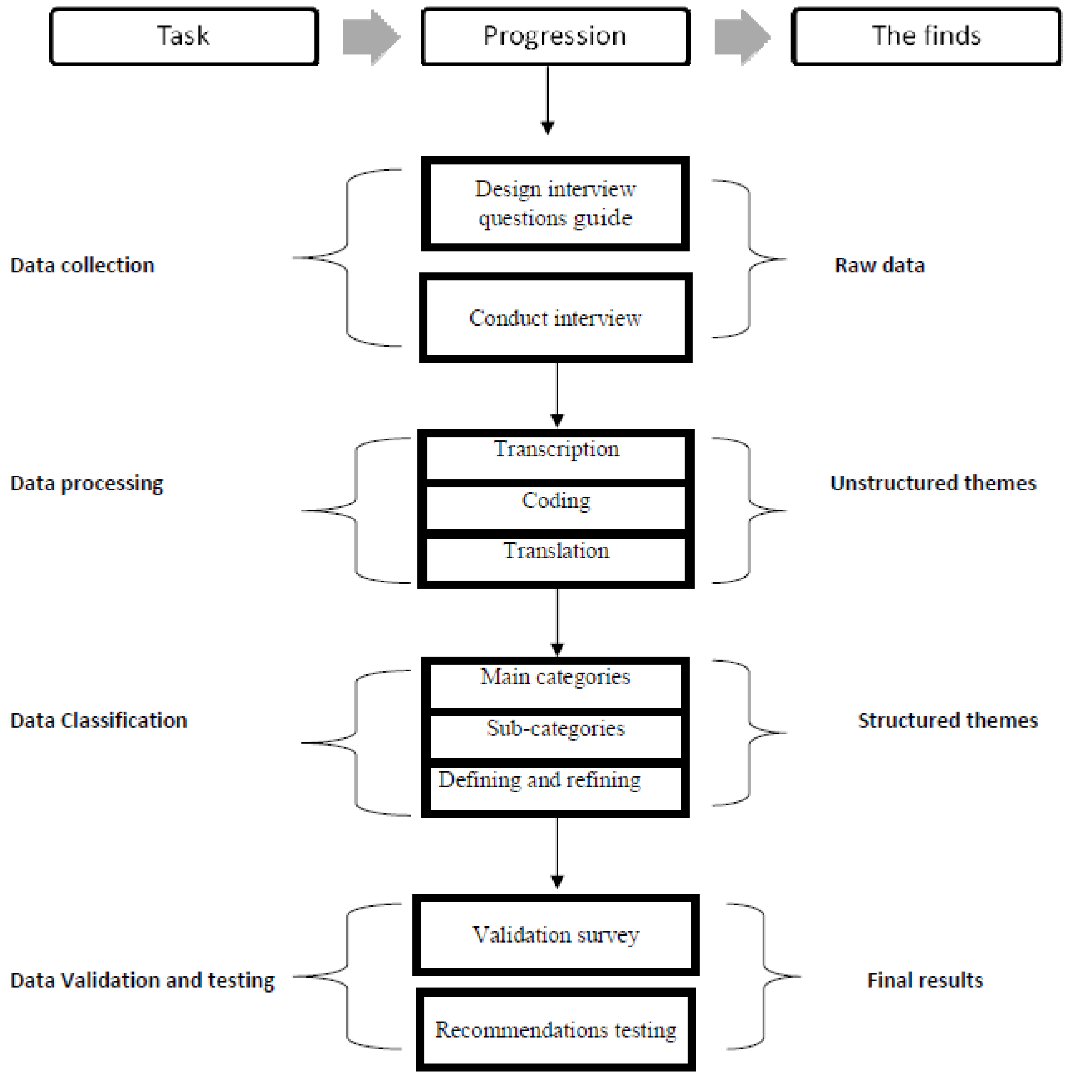


Figure 4.3: A Schematic Representation of the Full Research Methodology

4.6.1 Main Investigation (Interview) Survey

4.6.1.1Developing the Protocol for the Main Investigation (Interview) Survey

In order to develop the interview protocol it was necessary for the researcher to conduct a thorough literature search to ensure that questions being asked did not already have answers. Consequently, the literature was used as a basis from which to develop questions to guide the flow of the semi-structured interviews. Once formulated, the interview protocol was reviewed by the researcher' supervisor to ensure that the questions could be understood by the interviewees, and after minor corrections, a final version of this guidance was reached (This can be seen as Appendix B).

4.6.1.2 Establishing Contact

In order to establish contact with potential participants, the researcher conducted an extensive online search using official websites, and made many telephone calls. Eventually, a list of appropriate participants – individuals involved with the Saudi Arabian architectural building industry – was drawn up. During their initial contact with the researcher, these various individuals were asked whether they would agree to participate. Some agreed to take part in a face-to-face interview, others preferred a telephone interview, and some others declined to be involved. In respect of those who agreed to participate, the researcher asked some brief questions about their experience in construction and building projects, specifically concerning their exposure to conflict, to ensure that they met the criteria for the sample. In a few cases, they did not fulfil the criteria, and consequently, they were not eligible to continue. In total, 46 individuals were contacted before a sample of 30 was obtained.

4.6.1.3 Sampling Selection Criteria

4.6.1.3.1 Selection of Research Participants

In addressing the first research objective (see section 1.4 in Chapter one), the underlying conditions of conflict and the causal chain of conflicts in building projects in Saudi Arabia are examined using an interpretative research approach based upon analytic induction. Thirty (30) in-depth semi-structured interviews were undertaken with contractual project parties, each of whom identified a project case (PO) containing examples of conflict(s) in which they had been actively involved.

A purposeful sample was obtained, with participants falling into the categories of project owners, design consultants, main contractors and, sub-contractors (the key project practitioners). These categories were chosen in advance by the researcher in order to elicit different viewpoints and examine various perceived causes of conflict. Practitioners or project parties within a specific category (e.g. project owners) tended to express their views and experiences as to the causes of conflicts with respect to specific examples. The variety in the nature of the participants was believed to provide a holistic view of conflict causation which had the potential for being eradicated or minimised.

The sample broke down into: 8 (27%) client representatives, 8 (27%) design consultants, 8 (27%) main contractors, and 6 (20%) sub-contractors; and the criteria for inclusion were:

- Having more than five years' experience of work on one or more Saudi Arabian construction project(s).
- Having actively received or been involved in at least one conflict case in a public sector building project.
- Having worked as an individual or a team member within a construction organisation or body.
- Having worked in a position as client representative, design consultant, main contractor, or sub-contractor in the project to be analysed during the interview session.

In order to establish that the criteria for selection were met, each individual was initially asked to describe his working background. With respect to the categories of practitioner identified, a definition of each of these in terms of the contractual responsibilities and business, has been provided in Appendix A, Section 1.

4.6.1.3.2 Selection of Projects (PO)

Before the start of each interview session, the participant involved was asked informally to describe a recently completed public sector building project in which he had been involved. The reason for this was to make sure that each of the building projects discussed had the following characteristics:

(i) Public projects:

Medium or large size projects seem to be more common in the Saudi Arabian construction industry than private projects, and they are more exposed to conflict causes such as delays, cost over-runs, and poor quality of workmanship, etc. In addition, public projects relatively easy to access information about.

(ii) A project at the final stages of completion, or having been recently completed:

Recent or ongoing projects were required to ensure that there was not so much distance in time between the interviewee and the project, and that his memory of events was not impaired. A limit of three years was imposed on completed projects, thereby meaning that for projects already finished, the date of completion had to be between 1 September 2008 and 30 September 2010, whilst for ongoing projects their final stages of completion had to be just beyond 30 September 2010.

(iii) A project determined as medium or large in size:

Projects classified as medium or large usually have a contract value of more than SR 10 million (Al-Ghafly, 1999), which when converted into US dollars at the fixed exchange rate of 3.75, amounts to about 2 million and 600 hundred US dollars. Small projects are excluded on the grounds that they are not complicated in nature and, therefore, not prone to significant conflicts.

(iv) Projects based in the Kingdom of Saudi Arabia

A description of the projects used for discussion in the interviews as examples of conflict case studies can be found in Appendix F. However, minimal details of the 30 building projects are also presented in Table 4.2.

Table 4.2: Details of Interviewees, Projects, and Codings

# Interview	Research respondents code	Project case studied (PO)	Project entity by business	Project party
01	R01	PO01	Eng and consultancy services	Design consultant
02	Ab02	PO02	Project owner	Client representative
03	M03	PO03	Eng and consultancy services	Design consultant
04	S04	PO04	Project owner	Client representative
05	N05	PO05	Project owner	Client representative
06	D06	PO06	Project owner	Client representative
07	T07	PO07	Sub-contracting	Sub-contractor
08	MA8	PO08	Contracting	Main contractor
09	Y09	PO09	Project owner	Client representative

10	L10	PO10	Contracting	Main contractor
11	H11	PO11	Sub-contracting	Sub-contractor
12	JS12	PO12	Eng and consultancy services	Design consultant
13	Ak13	PO13	Contracting	Main contractor
14	Gd14	PO14	Sub-contracting	Sub-contractor
15	La15	PO15	Sub-contracting	Sub-contractor
16	EM 16	PO16	Contracting	Main contractor
17	AH17	PO17	Contracting	Main contractor
18	MS18	PO18	Eng and consultancy services	Design consultant
19	FH19	PO19	Eng and consultancy services	Design consultant
20	EA20	PO20	Project owner	Client representative
21	ST21	PO21	Project owner	Client representative
22	MG22	PO22	Project owner	Client representative
23	HS23	PO23	Eng and consultancy services	Design consultant
24	AS24	PO24	Eng and consultancy services	Design consultant
25	GH25	PO25	Contracting	Main contractor
26	SS26	PO26	Project owner	Client representative
27	AD27	PO27	Eng and consultancy services	Design consultant
28	AF28	PO28	Contracting	Main contractor
29	MK29	PO29	Contracting	Main contractor
30	AJ30	PO30	Sub-contracting	Sub-contractor

4.6.1.4 Interviewing

4.6.1.4.1 Conducting the Interview

Having established the eligibility of 30 interviewees, according to the criteria already presented in Section 4.6.1.3, the researcher arranged meetings or times for telephone appointments, according to the preference of the participants. All participants were informed that the researcher wishes to record the interviews but told specifically that the information would be used only for research purposes. In respect of the face-to-face interviews, the researcher visited the participants' companies, and depending upon the location of the company, these interviews sometimes took all day. For example, the preparation, waiting and long distance travel required might take a morning, an afternoon, or an entire day. The duration of each interview meeting with the research respondents was between 20 and 40 minutes. The variation was accounting for by several factors, the most prominent being whether the interview was conducted by telephone or face-to-face, how relevant the interview questions were to particular participants, and the content and the number of conflict events that were presented by the participants. Table 5.1 (in Chapter Five) provides more information about the method (face-to-face or telephone) and duration of each interview.

4.6.1.4.2 The Interviews Survey Exercise

In most of the interviews, the formal conversation began with an explanation about the purpose of the meeting in the form of a briefing outline elucidating the research objectives. Thereafter, as each interviewee showed his readiness to start the interview, the researcher switched on the recording machine and began to ask the pre-determined questions (17 in total), referring to the written list already drawn up to guide him, and which the researcher intended to read from if necessary. The semi-structured interview is generally guided by a framework that provides both the interviewer and the research participant with sufficient flexibility for themes to probed and for new leads to be followed.

However, at the beginning of each interview, the conversation was more structured, in order to establish demographic information and details of the project to be discussed (see Appendix B, the questions in Sections 1 and 2).

After collecting this information, the actual semi-structured interview began to be conducted by using open-ended questions. The researcher asked the questions concerned with each section, and then depending upon the answers, either moved onto the next section, or took the opportunity to lengthen the discussion by asking unplanned questions about a particular topic if the participant had introduced something of interest in his response. During the early interviews, the researcher's main concern was to collect information by referring to the project life cycle (PLC), but as the interview exercise progressed, similarities and differences in opinions and experience emerged from the participants, and it gradually became more obvious what was going to be said. Hence, the approach was inductive, thereby enabling a degree of sub-classification to be undertaken by the researcher. The sections of the chapter discuss all the issues concerned with the classification system are presented in section 4.7.4 and 4.7.5.

4.7 Qualitative Analysis

All of the interviews were conducted in Arabic and each interview conversation was recorded. As soon as each interview was completed and the researcher had reached home, he began the data analysis, which essentially became a continuous process during the period when the 30 interviews were being held. The procedure adopted for each interview is indicated in the following sub-sections. In order to ensure that a rigorous process was used for the analysis of the qualitative data**,** the researcher consulted different guidance materials. However, for most part he followed the recommendations presented in "Interviewing As Qualitative Research: A Guide for Researchers in Education And the Social Sciences", by Irving Seidman (2006).

4.7.1 Data Transcribing

In terms of the face-to-face interviews, the researcher used a Samsung recording machine (Samsung yp-u4) to capture the conversations with the research participants. In respect of the telephone interviews, these were conducted over the Internet, using the 'Skype' software ans specifically recording the conversations with the MX Skype Recorder software. Once the conversations were finished and the telephone line disconnected, the recordings from both pieces of equipment were automatically encoded in an mp3 audio format file. All the audio files created were located and stored in a separate file in the researcher's personal computer. The task was then to find software that would allow control of playback of the interviews while transcribing the materials into a Microsoft Word document. Windows Media Player was chosen since this allows playback to be controlled, and sections to be repeated should a portion of the speech on the audio be unclear and clarification be necessary. While the Windows Media Player software was running, the practice of transcribing was undertaken so that it was written in parallel in a Microsoft Word document in Arabic. At this point, the data became 'processed data' rather than 'raw data'. At the top of the first page of each transcription, information relating to the interview was noted; this included the date of the interview, the research participant's information (name, contact, and email address, etc), and the information about the project discussed.

The process of transcribing was time-consuming, with an average ratio of eight or nine hours of transcription time to one hour of audio length). For example, it took approximately 100 minutes to transcribe a 15-minute interview. The interviewees' style of speech played a significant role in determining the length of time it took to transcribe their interview; for example, some respondents' comments were short and relevant to the subject, while others were lengthy and not entirely relevant. However, all the conversations were transcribed with an emphasis on functional accuracy rather than on the level of detail. In some cases, words or phrases such as "uh", backing-and-filling, false starts, tag questions etc. were excluded.

Concurrently with this transcription process, and according to his personal judgment, the researcher determined the significant data items for analysis. The data items chosen were placed in brackets and colour-coded for easy identification and subsequent further coding.

Finally, after finishing the transcription of each interview, the transcript was saved and backed-up in separate soft file documents for later review and further processing.

4.7.2 Data Coding

When the transcription of the interviews was completed, the next step was to check each individual interview script by re-playing the audios. The aim of this was to ensure that all significant data items were marked with the text highlight colour (usually yellow) and kept between brackets, and that nothing was omitted. Immediately after this checking process, the researcher conducted a content analysis of the data from each interview script. However, to facilitate this procedure, a separate structured table (interview table) was created under each interview script within the same Word file document. The interview tables were standard and in a simple form to enable all the texts (significant data) extracted from the interviews in the same file document to be logged in. Each of these interview tables was prepared so the significant data items, which were all placed in brackets and coloured yellow, could be ready for efficient data processing in terms of data coding, translation and classification.

In order to code the data from the highlighted texts within the interview scripts, and to re-arrange these texts, the researcher effected a ‘cut and paste’ process in a systematic manner, whereby each text was transferred to the interview table for that particular interviewee, and given a distinct code. Figure 4.4 shows an example of the interview table related to the interview participant M016. The process conducted was as follows:

1. A ‘cut and paste’ process in respect of the research participant’s information (name, contact, and email address, etc) and the project case discussed, was conducted. The information extracted was placed in a separate box at the top of the relevant interview table then this was translated from Arabic to English, keeping the English words only.
2. A legend was placed at the top left of each interview table comprised of the initial or acronym of the interviewee concerned, together with the serial or interview number. An acronym was also given for the project case that was under discussion with the participant concerned. For example, the research participant Eymen was given the **Respondent code** EM16, ‘EM’ indicating his initial or acronym, and 16 indicating his interview number. The project case being discussed by this person was given the initials ‘PO’, extracted for the word ‘project’; associated with interview number ‘16’. Hence, **Project code** was PO16. This system for allocating respondent and project codes was commonly used for each interview table.
3. A ‘cut and paste’ process was carried out for what remained of texts (**original extracts**), which were in Arabic and already placed in brackets and colour-coded before the transcription processes, and each one was logged in a separate box within the interview table. The first highlighted text within the transcript was placed in the first top box and called **Data item No. 1**, and the second text was called **Data item No. 2**, and so on, until each item was logged in its logical sequence.

4. A ‘cut and paste process’ was undertaken for each interview script after each text within the interview table had been translated. Each **translated extract was** inserted in a separate box under the original Arabic extract. Further information about the translation process is indicated in Section 4.7.3.
5. Each translated extract within each interview table was given a separate **extract code**. In order to systematically conduct the data coding process for each text, two steps were taken: firstly, the first text at the top of the interview table was given a serial number of ‘01’, the second top text was given ‘02’ and so on, forming a numerical sequence. For example, in the interview table related to participant EM16, the first top text was given a serial number of ‘01’. Therefore, this extract was given a code of EM16-01 and the second top text was given a serial number of ‘02’ so it was given a code of EM16-02.
6. The second step was to give each text a distinct code after completing the data classification process. In this stage, an additional legend associated with each extract code indicating what class or category of text it belonged to was added. These legends were R, C, or PM depending upon the data analysis conducted by the researcher. If, for example, the extract EM16-01 were classified as R, the code for it would be EM16-01/R. Similarly, if it were classified as C or PM therefore, the extract code would be EM16-01/C or EM16-01/PM respectively. This data classification process formed the final part of the data coding process. It was applied to each extract code within each interview table. Further information about how the data classification process has been conducted and what data categories R, C, and PM mean are provided in Sections 4.7.4 and 4.7.5.

4.7.3 Data Translation

A further process in the chain of data management involved the researcher in transposing the spoken words (data translation) from the Arabic tape-recordings into English. This translation process was much more complex than transcribing because it involved handling the more subtle issues of connotation and meaning, and this was in addition to establishing the appropriate vocabulary and grammatical structure of the words and sentences that would generate accurate and meaningful data originated in the Arabic language.

The researcher considered it paramount to retain each interviewee's intended meaning in the translation, but as noted by Al Hamdalla (1998), it is not always possible to convey the exact same meaning in English as is intended in the Arabic language. For this reason, and as the translation of the conversations was a difficult and time-consuming process, the original transcription was written in Arabic, and only the words placed in brackets were translated. In this activity, some words were translated by a specialist, but in the majority of cases, the translation was performed by the researcher.

Figure 4.4 shows a sample of a transcribed text, after having been through the processes of data transcription, coding, and translating.

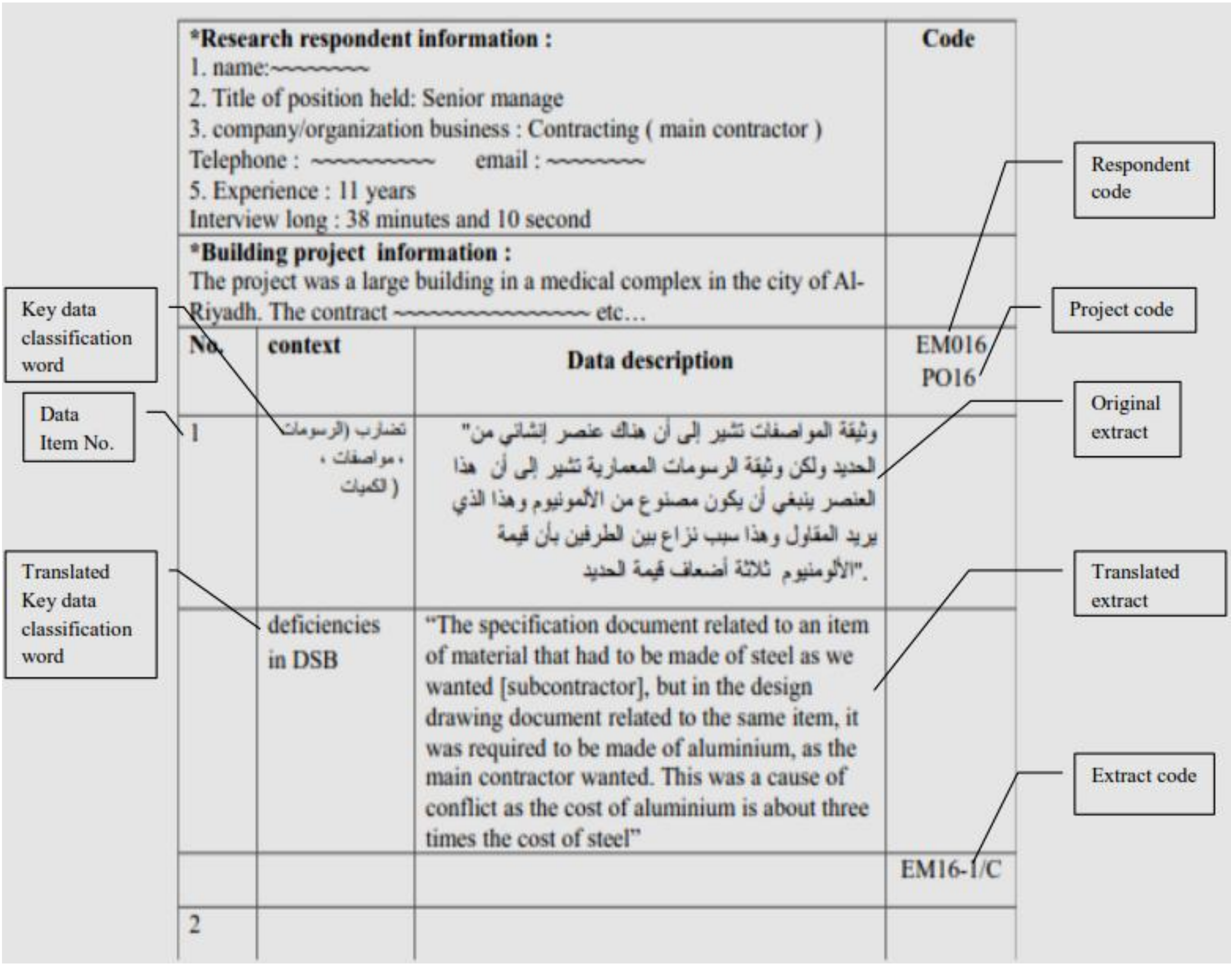


Figure 4.4: Sample of a Transcribed Text

4.7.4 Data Classification

At this stage of data processing, the researcher began the process of data classification by the use of content analysis for both the Arabic and English texts that appeared in the interview table under Data description. This process of data analysis was undertaken to review carefully, each data item description, and then the researcher chose a word(s) that was compatible with the original one, as a means of reflecting the content of each data description. Each of these data descriptions were given (as shown in Figure 4.4) a **key data classification word**(s) (for Arabic data description) and a **translated key data classification word(s)** (for English data description). This process was applied to all data descriptions within each interview table.

In order to conduct further data analysis of all of these data descriptions, and in an effort to move from the initial impressions gained from the unstructured data towards a more systematic process whereby the data could be structured, the researcher established a data classification system.

4.7.4.1 Data Classification System

Two methodical approaches were used in developing the main and sub-categories associated with the content analysis, as follows:

(i) The main data category was concerned with data that was consonant with the four phases of the project life cycle, namely: pre-design, pre-construction, construction, and commissioning and completion phases.

(ii) The sub-category of data was concerned with data that were similar in their description or content.

As a starting point and to facilitate the procedure, the researcher established a Data Table which contained separate boxes (main data, and sub-data) into which the English data descriptions and extract codes belonging to them were transferred from the interview tables. This task was achieved by a ‘cut and paste’ process in respect of all such information. As this process was completed, the researcher started to provide identification numbers for each data description, as a result of which, the following information was available within the Data Table at a glance:

(i) A full description of data;

(ii) An identification number belonging to each data description; and

(iii) An extract code belonging to each data description.

4.7.4.2 Processing the Data for Classification

To ensure the rigour of the data classification process for the information within the Data Table, the researcher elucidated the meaning of the terms being used for the process, forming two separate aspects, as follows:

1. In terms of the set stages of the project life cycle (PLC). This aspect of the data classification system related to the main category of the data to be classified in terms of their consonance with different phases of the project life cycle.

As the research is related to public projects in Saudi Arabia, the PLC of a typical building is based on the traditional procurement system. This type of procurement system is the most widely implemented in government projects as it clearly conforms to the GTP as well as the standard forms of contract related to public sector projects. Therefore, the PLC approach chosen involved four main phases, namely: pre-design, pre-construction, construction, and commissioning and completion. Each of these stages involves several sub-processes under which a number of activities are performed. However, each one of these project stages is discussed in Appendix A, Section 2

2. In terms of the similarity or compatibility of the data description or content. This aspect of the data classification system related to the sub-category of the data to be classified in terms of their reflection of the same or similar meaning.

Additionally, each data set containing the same or similar content was brought together under the appropriate sub-category. The titles of these sub-categories were compatible with or relevant to the data content or descriptions. Each one of these titles represented a cause of conflict, and each was discussed in Chapter Five.

However, after completing Interview table # 23, and prior to conducting the last seven interviews, the researcher began the compilation of the Data Table into which the data obtained from Interview tables # 1–23 were transferred. On the basis of the information gathered up to that point, the researcher started to prepare the Validation Questionnaire to be used for the quantitative exercise which was intended to determine whether his initial interpretation of the interview data was correct, and whether it needed any enhancement.

For this step to be taken, the researcher completed two further data processes upon all the data within the overall Data Table so that each item could be properly presented within the Validation Questionnaire as a separate question. The two additional processes were:

i. A further data sub-category exercise, and

ii. Defining and refining of each data description (themes).

These two data processes aimed to reduce the number of data descriptions and sub-categories by collapsing some items into broader sub-categories. The two sections below provide more information on how these additional processes were performed.

4.7.5 Developing Categories and Sub-categories

As mentioned earlier, all of data descriptions within the interview tables were transferred into Data Table. After that each description or set of data descriptions was /were ordered in the Data table in a way that was consonant with their appropriate place in terms of project life cycle. Subsequently, each description was reviewed again, and as it became clear that essential features or key words or phrases appeared in several, it was recognised that these would become central to the ongoing process of data sub-categorisation, allowing titles of initial sub-categories to emerge or to become detached from each main classification system or category. Essentially, during this process, the difference between categorising 'latent condition of conflict' data (which should be placed under a project phase - main category - where conflict originates from), and 'conflict' data, where the actual occurrence of a conflict takes place, is made clear. Indeed, this approach allows some new data descriptions or themes to be identified and displayed in other sub-categories. For example, 'Utilities Service' (section 5.3.6 Chapter Five) was initially used to contain all themes and issues related to project utilities in both the design and construction phases. The issues connected to the construction phase were taken out to be placed under 'Utilities Service Connection' (section 5.3.20 Chapter Five). Also 'Architect Selection' and 'Selecting Construction Team' (see 5.3.5 and 5.3.14 in Chapter Five) were separated, both having originally been subsumed under one sub-category: 'Selecting project team'.

Consequently, to ensure a rigorous categorisation process for all data descriptions and themes within the Data Table, and to be as accurate as possible when categorising the data, the researcher considered the definitions of the latent condition of conflict (R), conflict (C) and PM strategy data (PM), which were the three main types of data. These definitions are as follows:

- Latent condition data (R) descriptions or themes: describes the antecedent or underlying conditions (situation) which may or may not have reached the level of awareness for at least one of the project group. This may encourage potential conflict to occur on other on subsequent occasions.

- Conflict data (C) descriptions or themes: describes a process or occasion that begins whenever an individual or group feels negatively affected by another individual or group.

- PM strategy (PM) data descriptions or themes: describes a suggestion or recommendation in terms of project management strategy to be applied to prevent or resolve conflict.

As all of these data descriptions or themes were general and did not seem to fit into a particular project life cycle stage as per the main classification system (pre-design, pre-construction, construction, and commissioning and completion), they were initially categorised as 'miscellaneous'. However, as they became clearer in meaning or function, they began to fit with several topics during a continuous process, under the main category of 'General administration and regulation'. As the researcher continued to go through this iterative process in more depth, new themes were identified in keeping with most of the initial sub-categories, which were re-defined or re-titled to ultimately assign them a more consistent label which could be used later in the research analysis and discussion.

4.7.6 Defining and Refining Themes

Once the categorisation process had been completed, each theme that had been classified under a particular title or sub-category was examined in order to determine whether it correctly fitted with the other themes, and whether these themes together formed a coherent pattern. This extra amount of time and effort expended on correcting themes ensured that none went missing or were incorrectly placed. At this stage of data processing, the researcher started to summarise and identify any similarities in the data descriptions (themes) in order to place them in the appropriate sub-categories. This was done by assembling each set of themes or data descriptions from the same category and then defining and refining them to more general themes which could accommodate or represent all the other themes as precisely as possible. As a result of this re-wording process, many themes were combined with others and were consequently short-listed.

Some of these general themes, which contained both conflict (latent condition conflict data) and PM strategy themes, were capable of successfully integrating the two. In some cases, however, where these two types of data could not be integrated, the PM strategy data received separate descriptions. For example, the PM strategy data heading entitled 'The need to give the architect sufficient time to develop good design drawings/documents' was separated from the descriptive title 'Insufficient time was given to the architect to develop all design drawings/documents' for the purpose of capturing the actual meaning obtained from the participant.

During this process of refining statements for describing themes, the original meaning of the refined themes was carefully preserved. The researcher tried to adhere to the same form and data content, reflecting the meaning of a data group as accurately as possible without overly complicating it. In addition, feedback was taken from some colleagues, and as a result, several new statements had to be constructed. For example, 'poor quality of working' became 'low quality workmanship'. However, the goal of this rewording process was to ensure that during the Validation Survey, the respondents would recognise their project situations as appropriate.

Finally, as a result of all of these analytical processes, the complete Data Table emerged, which can be seen in Appendix D.

4.8 Quantitative Analysis

4.8.1 Data Validation Survey

Simultaneous with the compilation of the Data Table, the researcher started to develop the Validation Questionnaire to be sent to the interviews as a mechanism for confirming his interpretation of the conflict data. In order to focus on the conflict data, only that existing within the Data Table was included in the questionnaire, which was constructed by formulating a separate question for each data item.

Additionally, some instructions were provided on the questionnaire to guide the respondents (the original interviewees) in completing the instrument, and a further question was included that was designed to obtain the respondents' indications of the intensity level of the conflict they experienced (as described during the interviews). The Validation Questionnaire appears as Appendix C, and a full description of the questionnaire design together with the results, analysis and discussion of the whole Validation exercise is presented in Chapter Six.

4.8.2 Recommendations Test Survey

Following the validation survey, another final quantitative check was conducted to test the data relating to the project management strategy (PM strategy data). The questionnaire developed for this aspect of the research consisted only of the recommendations emerging from the interview exercise and used a four point rating system to show degrees of agreement with the recommendations made. Referred to as the Recommendations Test Survey, the instrument (presented in Appendix G), was targeted at a large population of construction project industry participants, that is, project owners, client representatives, designers, design consultants, main contractors, sub-contractors, quantity surveyors, and some other appropriate respondents. In order to establish the sample, the researcher contacted the Saudi Council of Engineers who provided him with its data base as a means of identifying suitable recipients of the questionnaire. In total 672 questionnaires were mailed. A full description of how this survey exercise was conducted and the results, analysis and discussion is presented in Chapter Eight.

4.9 Statistical Analysis

During the data analysis, several statistical methods were used as follows:

4.9.1 Summary Statistics

Summary statistics, including histograms, percentages, averages, mean and range values have been used to present the data throughout Chapters Five, Six and Eight.

4.9.2 Chi-squared Test

Each antecedent or latent condition of conflict, which may or may not have reached the level of awareness, can provoke (or not) a conflict(s), whether immediate or later. In other words, the presence of one cause of conflict is contingent upon the presence of another cause of conflict. By comparing conditions of conflict in this way some significant associations between these causes have been determined. This hypothesis is reported in Chapter Five and in Chapter Eight and is supported with various examples within these two chapters. It has been described mostly in Chapter Eight as ‘conflict association’. To determine whether or not any significant associations exist between causes of conflict, the researcher used the chi-squared test of association.

In the chi-squared test, it was considered that there are two categorical dichotomous variables: cause (present=yes/absent=no) and conflict (present=yes/absent=no). The association between the two categorical variables is best presented in a 2 x 2 contingency table as shown in Table 4.3. The chi-square test is the standard statistical test used to compare measures of association between two categorical variables. The null hypothesis and alternative hypotheses for the chi-square test are:

H_0: There is no association between the two variables

H_1: There is a statistically significant association between the two variables

The chi-square test generates a test statistic and associated p-value. If the p-value is less than 0.05 (5% level of significance) then we can reject the null hypothesis and accept the alternative hypothesis that there is a statistically significant association between the two variables (cause and conflict).

However the chi-square test is only valid if the expected frequencies in the cells of the contingency table are greater than 5. If this condition is not met, Fisher’s Exact test should be used to test the null hypothesis instead of the chi-square test. Fisher’s Exact test also generates a p-value and if the p-value is less than 0.05 (5% level of significance) then we can reject the null hypothesis and accept the alternative hypothesis.

Table 4.3: Contingency Table

2 by 2 contingency table	Data #17: There was a dispute due to unforeseen ground conditions or foundation problems during the construction phase.		
Data #66: The geotechnical report was not factual.		Yes	No
	Yes	4	0
	No	1	22
• The result from the Fisher-Freeman-Halton exact test is P = 0.0003 indicating that there is a statistically significant association between the two conflict variables.			

However, the results of this particular test are presented in different places within the analysis and the discussion of Chapter Five.

In addition, Fisher's Exact test was also used to conduct a statistical analysis and generate the p-value upon results obtained from the Recommendation Test Survey. The researcher used the SPSS software programme for this. This test recognises any statistically significant differences between the groups of responses. The results of this particular test are presented in different places within the analysis and the discussion of Chapter Eight. However, for more description of the numbers and percentages for each recommendation tested, the reader is referred to Appendix I.

4.10 Bias

In order to minimise the possibility of bias in the qualitative aspect of the study, the researcher applied the sampling selection criteria equally to all the research participants , and to the examples of architectural projects that were discussed within the interviews, as indicated in section 4.6.1.3. Bias was also minimised by introducing a large degree of randomisation in the selection of the research respondents. The interview sample was reached in a purposeful manner to secure representation from key parties in the Saudi Arabian architectural industry. In addition, all of the research respondents were involved in the events which the researchers try to investigate. However, as some of these events discussed with interviews participants are concern about conflict of the interest between project parties, the researcher noticed that sometime the research respondents attributes the conflict causes to the other people or other factors which as project party he is not responsible for which may impact of the facts of the events and create bias. This is probably attributed to the fact that each research participant represented a particular type of party to the project business, and brought to the discussion his own perspective on why conflict occurs between himself and another party. Such bias effect is probably less noticeable in the Recommendation Test Survey as the questions to be answered were not directly related to the research respondents but were general questions relating to any conflict situation. Furthermore, the sample for the Recommendation Test Survey was totally random and this condition in itself reduces the effect of bias.

In respect of his conduct of the interviews, the researcher made every attempt to be impartial and during the data processing he was acutely aware of the need to remove any bias that might have been detected in the interview, and in the data interpretation. This involved the researcher in not following his desires and expectations in terms of the results by not allowing interference to take place. This was particularly the case during the refining processes where the original interview statements of the respondents were adopted to form the validation questions, keeping in mind that these statements needed to make sense and be representative. Original sources of data were also reviewed many times to ensure that re-phrased data were appropriately refined in order to carry the same sense. Furthermore, references were cited throughout the discussion and analysis of this research project in order to help the reader to obtain an unbiased view.

4.11 Ethical Issues

All conversations with the 30 research participants (whether face-to-face in person or by telephone) were recorded using digital audio equipment. In order to proceed with this practice, the researcher asked each participant before the event for permission to record the interview proceedings, and each individual agreed. Additionally, the researcher informed all participants that their conversations would be used solely for academic purposes and that the content would remain confidential. This same assurance was given to the respondents to the Recommendation Test Questionnaire. And finally, those participants who requested a copy of the research project outcomes were assured that once complete, these outcomes would be sent to them.

4.12 Conclusion

In this chapter a though discussion of the methodology used to gather the data from key players within the architectural project industry, has been presented. It was indicated that for the purpose of answering some of the research questions, an inductive approach, using qualitative interviews was the most appropriate method since this would allow the generation of hypotheses and theories that would help to identify the antecedents of conflict, and generate knowledge of how these conflict causes can be prevented or minimised by effective strategic project management. The qualitative data obtained were subsequently subjected to two validation exercises which followed a quantitative approach. The first such exercise was a check for internal validity that was conducted through a Validation Questionnaire completed by the interviewees after the interview data had been analysed. This was to check the researcher's interpretations of the conflict causes. The second validation exercise was a check for external validity and was performed by presenting the recommendations for project management practice in respect of conflict handling, to a large random sample of previously uninvolved construction industry personnel. This survey also had the benefit of indicating the extent to which the findings might be generalised to the Saudi Arabian industry.

Also in this chapter, details have been provided about the data classification system which was produced, and this is used as the basis for the analyses presented in the subsequent chapters.

CHAPTER FIVE

Analysis and Discussion of Data

5.1 Introduction

This chapter provides an analysis and discussion of data collected from semi-structured interviews with thirty research respondents. A general description of these data is given in sections 5.2.1 to 5.2.3. Specifically in section 5.2.1 the general characteristics of all the data collected during the interview exercise are presented, thereby showing the three classes, namely *latent condition, conflict* and *PM strategy*. The information regarding each interview, namely, interview number, interview code, timing (in minutes) and whether it was conducted face-to-face or by telephone, is also shown. In section 5.2.2 all of these three classes of data are redistributed and presented in a way to indicate their general characteristics according to the data classification system. In section 5.2.3 only the conflict data, which contains just two classes of data *latent condition* and *conflict* data, is redistributed and presented again to indicate the nature of data according to data subject. This chapter also provides a further 30 sections (between 5.3.1 to 5.3.30) which represent all classes of data in a structured account which contains the discussion and analysis of the all conflict data collected. Some of the *PM strategy* data is also analysed in this section but the reader is refer to section 8.7 in Chapter Eight where all of *PM strategy* data is analysed and discussed in the same structured account.

Since all three classes of data are key terms that are frequently repeated throughout the analysis and discussion within this chapter, they are briefly described at this point in the chapter, as a reminder of their meaning:

Latent condition	describes as antecedent or underlying conditions (situation) which may or may not have reached the level of awareness for at least one of the project group. This may encourage potential conflict to occur on other, subsequent occasions.
Conflict	describes a process or occasion that begins whenever an individual or group feels negatively affected by another individual or group.

PM strategy	describes a suggestion or recommendation in terms of project management strategy to be applied to prevent or resolve conflict.

All the data collected falls within one of the above three classes, and is tabulated in clusters of the same class, in the Data Table (Appendix D). Some rewording has been done to facilitate the unification of certain data under one theme and therefore, placed in separate tables. Consequently, each of these tables comprised a single theme (or a number of associated themes), representing a particular subject which constitutes a unit for analysis and discussion purposes throughout this chapter. These subjects are discussed from sections 5.3.1 to 5.3.30. Additionally, each section contains discussion and argument which draws upon themes or data indicated in these tables, supported by relevant literature, as well as translations of quotations from the research respondents. The tables also display numbers associated with particular themes, in order to indicate the amount of data collected. Essentially, this strategy represents the number of times that the research respondents identified each particular theme during the interview and validation surveys.

However, some of the themes occurring within these tables are classified as conflict data only (whether latent and/or conflict data or both), and therefore they contain description(s) of conflict statements to describe particular causes of conflict, as for example, statement # 92 in Table 5.3.12, Section 5.3.11. In addition, some of these themes within the tables are classified only as PM strategy data. Hence, they contain description(s) of project management to describe a particular strategy for conflict prevention or resolution, as for example, statement # 42 in Table 5.3.11, Section 5.3.10. At the same time, there are also some themes within these tables which contain both classes of data, namely conflict data and PM strategy data, to express a particular theme. However, in these instances, the description of the theme tends to contain a statement of conflict rather than PM strategy. Nonetheless, any PM strategy data that is present can be viewed as being related to a suggested project management strategy to be applied to prevent or resolve the particular conflict described, as for example, statement # D21 in Table 5.3.10, Section 5.3.9.

5.2 General Description of Data

5.2.1 General Characteristics of Data according to Data Class

After analyzing the data obtained during the 30 qualitative interviews, the researcher derived and coded a total of 349 data items from the interview transcriptions. An explanation of the transcription and coding processes are provided in Sections 4.7.1 and 4.7.2 in Chapter Four. All of these coded data were conclusively classified, as indicated in Figure 5.5. Percentages were calculated as 49% for latent, 28% for conflict, and 23% for PM strategy data (see Figure 5.1), based on the number of data items obtained: 170, 99, and 80 respectively. In addition to this amount of data, a further 276 items of validation data were obtained from 22 interviewees when they completed the Validation Survey Questionnaire. These data are used to support the discussion and argument in this chapter. The description of how these validation data were analysed and represented has in Chapter Six. This chapter is solely concerned with data collected from the semi-structured interviews.

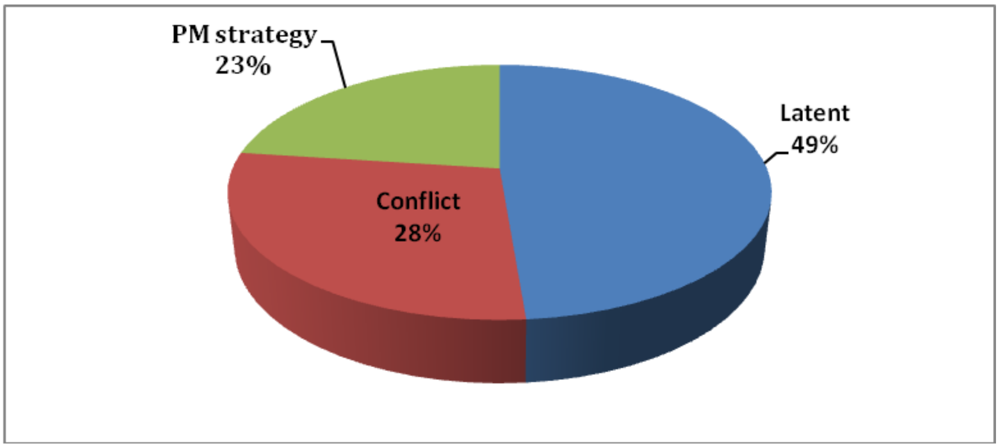


Figure 5.1: The Percentage of Data Collected According to Data Class (Latent, Conflict and PM strategy)

In Figure 5.2, the amount of data collected from each interview is reported, and from this it can be seen that there was great variation in this respect. For example, interview NO.09, Y09, ranked highest, with a total of 24 data items. By contrast, the data collected in interview No.11, H11, numbered only 3 data items and was ranked the lowest.

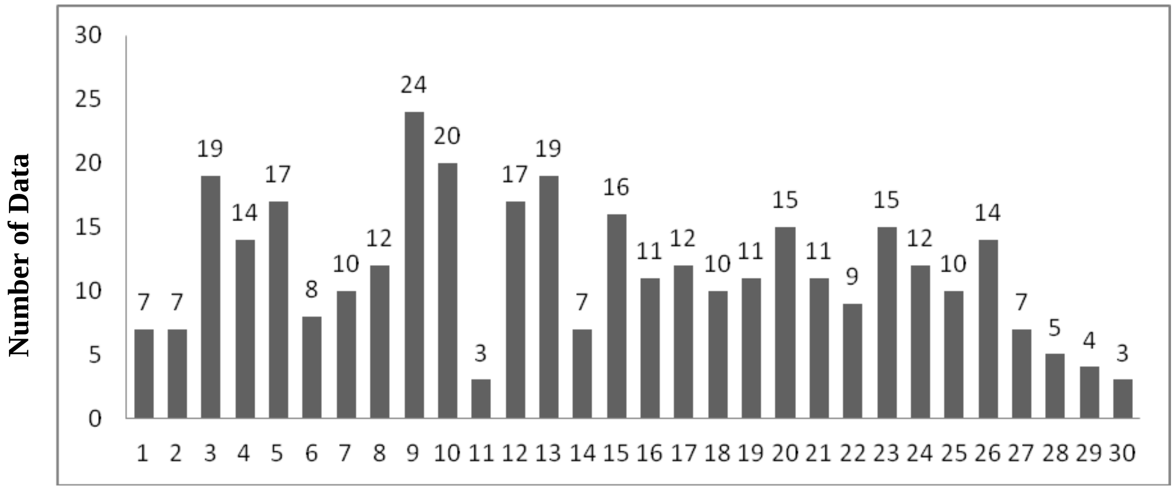


Figure 5.2: Amount of Data Collected Per Interview (project)

Some interviews took longer than others, depending on whether they were conducted by telephone or face-to-face. The amount of data collected, however, did not correspond proportionally to timing. Some interviews took longer while the amount of data collected was significantly less, and vice versa. One example of this is the interview conducted with H11, which took approximately 23 minutes and produced only three data items, while the interview conducted with JS12 took approximately 21 minutes (less time) and produced 17 data items. Table 5.1 below presents detailed summary information about all the interviews, from which a comparison of circumstances and outcomes can be seen.

Table 5.1: Interview Characteristics

Inter-view No.	Code	Interview method	Interview time in minutes	Data items collected	Inter-View No.	Code	Interview method	Interview time in minutes	Data items collected
1	*R1	Telephone	25.9	**7**	**16**	EM16	Face-to-face	38.1	**11**
2	*Ab2	Telephone	23.0	**7**	**17**	AH17	Face-to-face	39	**12**
3	M3	Telephone	42.0	**19**	**18**	MS18	Face-to-face	35.1	**10**
4	S4	Telephone	44.7	**14**	**19**	FH19	Face-to-face	27.0	**11**
5	N5	Telephone	30.4	**17**	**20**	EA20	Face-to-face	38.6	**15**
6	*D6	Telephone	34.4	**8**	**21**	ST21	Face-to-face	23.1	**11**
7	*T7	Telephone	33.7	**10**	**22**	MG22	Telephone	42.7	**9**
8	*MA8	Telephone	40.7	**12**	**23**	HS23	Telephone	36.4	**15**
9	Y9	Face-to-face	45.7	**24**	**24**	AS24	Telephone	27.0	**12**

10	L10	Face-to-face	20.6	20	25	GH25	Telephone	32.0	**10**
11	*H11	Face-to-face	22.9	3	26	SS26	Telephone	35.1	**14**
12	*JS12	Face-to-face	21.2	17	27	AD27	Telephone	32.3	**7**
13	Ak13	Face-to-face	22.2	19	28	AF28	Telephone	32.3	**5**
14	Gd14	Face-to-face	32.6	7	29	MK29	Telephone	27.6	**4**
15	La15	Face-to-face	31.5	16	30	*AJ30	Telephone	21	**3**

*** No response to Validation Survey Questionnaire.**

To help examine the length of the interview against the amount of data collected, a quantitative measure of 'average performance' (AP) can be defined as a value indicating the average amount of data collected per minute for each interview. Values vary between1.0 as the maximum and 0.1, which signifies the minimum. The results are indicated in Figure 5.3 below. The highest value (= 0.96) can be found in interview number 10 in Table 5.1. From this interview (L10), 20 data items were collected within 20.65 minutes. On the other hand, the lowest value was 0.13, which was found in interview number 11 (H11), as the interview produced only three data items within 22.9 minutes. Additionally, a further three interviews displayed AP values lower than 0.2, namely: AF28, MK29, and AJ30. These small values can perhaps be attributed to the different levels of data richness in each case study or interview. In other words, some case studies contained a more significant number of conflicts compared to others. For example, in the last interview, the respondent AJ30 indicated only one conflict issue in his case study, PO30, while respondent Y09 indicated a total of nine conflict issues in his case study, PO09.

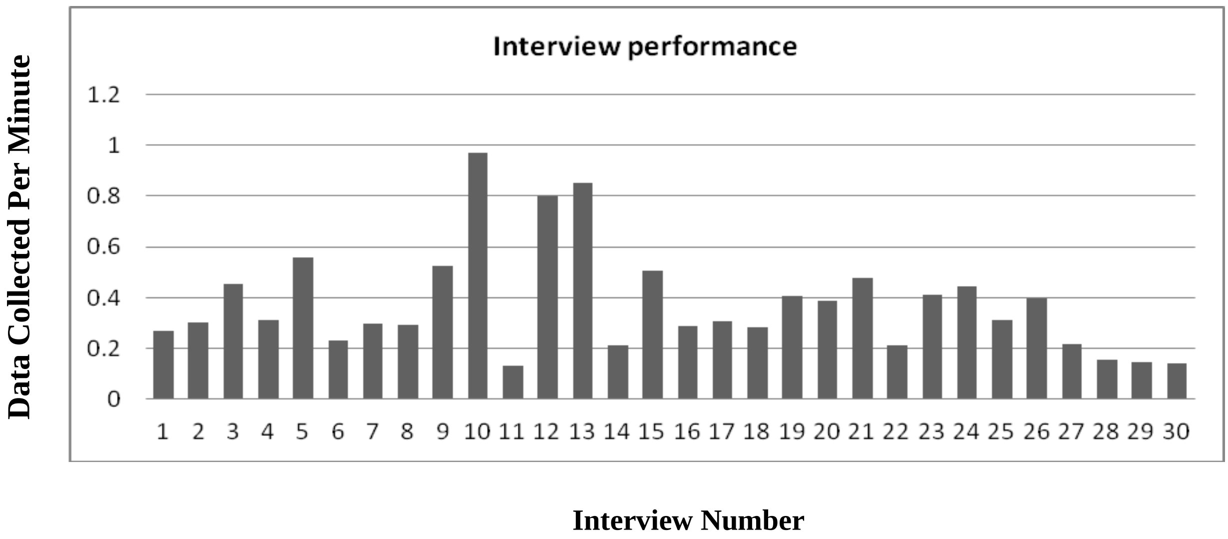


Figure 5.3: Amount of Data Collected Per Minute

5.2.2 General Characteristics of Data according to the Data Classification System

In the process of data processing and classification (described in detail in Chapter Four), each of the 349 data items collected fell into one of the three classes, namely: latent condition, conflict, or PM strategy. The total number of conflict data items alone, which represents the two classes of latent condition and conflict, is 269. The remaining data items, which represent PM strategy, number 80 in total. PM strategy is discussed in more detail in Chapter Eight. All the conflict data are distributed according to the data classification system .The final percentages were distributed as follows: 7.8% pre-design, 32.3% pre-construction, 50.1% construction, 3.7% commissioning and completion, and 6% general administration and regulation, as shown in Figure 5.4. This indicates that *construction* is the most important area, as it generated half of all the conflict data.

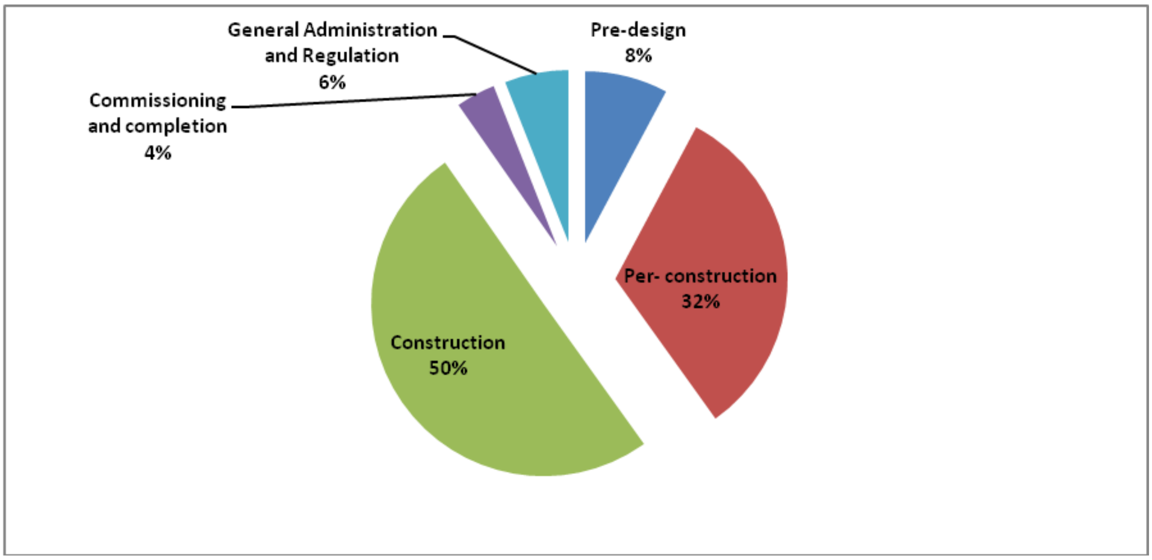


Figure 5.4: Percentages of Conflict Data Only (latent and conflict) collected According to the Data Classification System

A more specific comparison is indicated in Figure 5.5, which shows the results of the data distribution throughout the classification system in graph form. It can be seen that *conflict* in *construction* where the situations or issues originate from the construction phase account for 23%, and this percentage indicates that this is the most commonly collected data compared with the other data classes. This means that the severity or intensity of conflict between the project parties in the project cases examined is the highest over issues or matters originating during the construction phase. Other elements of the classification system, namely *pre-construction, commissioning and completion* and *general administration and regulation*, obtained lower in terms of *conflict* data showing percentages of 4.1%, 0.9% and 0.3% respectively. On the other hand, *latent condition* in *pre-construction* obtained the second highest percentage compared with the other data classes, at 20.9%. Meanwhile, *construction, pre-design, general administration and regulation* and *commissioning and completion* obtained lower percentages, these being 15.5, 6.0%, 4.3% and 2.0% respectively. As a final point, PM strategy data were distributed also across the various elements of the classification system: however, *pre-construction* obtained 9.5% while the other elements, namely *construction*, *pre-design*, *general administration and regulation* and *commissioning and completion* obtained 5.7%, 3.2%, 4.3% and 0.3% respectively.

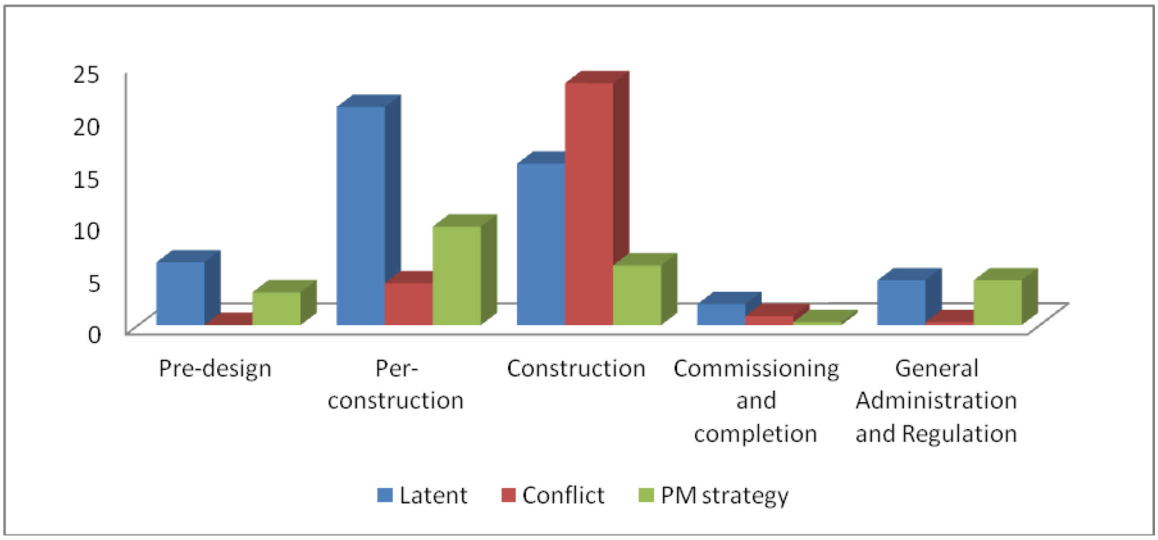
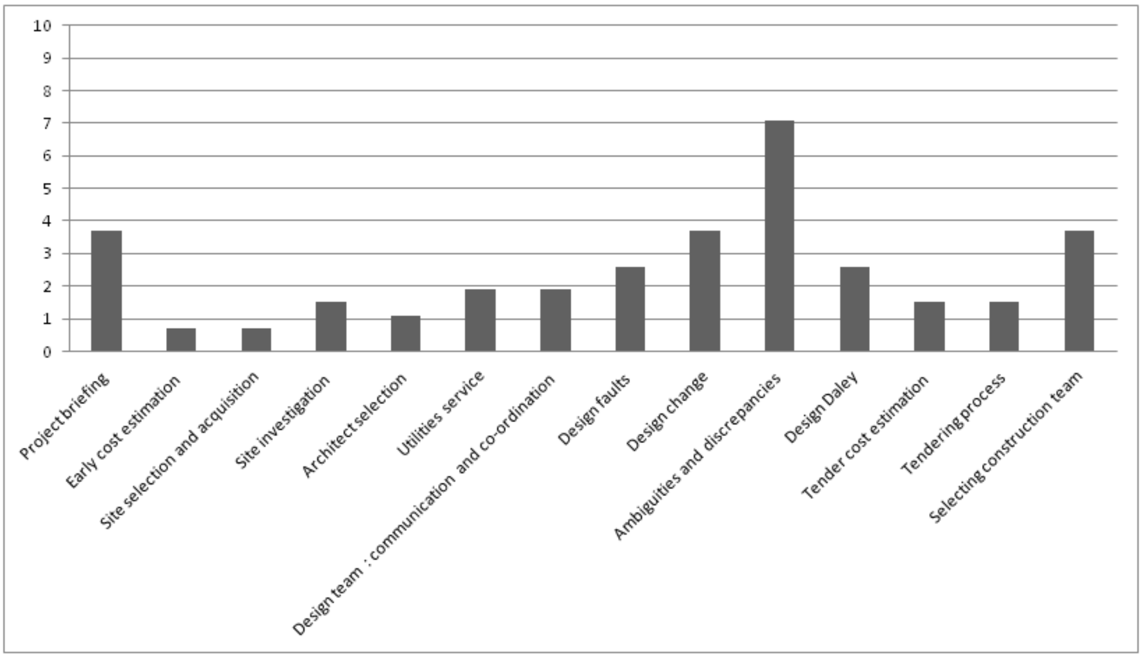


Figure 5.5: Percentages of Latent, Conflict and PM Strategy Data Collected According to the Data Classification System

5.2.3 Data Characteristics according to Subject (Conflict Data Only)

All the thirty interviews conducted contributed to the raw data, which was subsequently processed and classified for each interview as shown in Figure 4.3, Chapter Four. In the processing, a number of themes began to emerge. Similar themes were grouped together. However, within the various groups of data, it was evident that particular issues were surfacing, and consequently, all of these issues were entitled separately, the result being that 30 subjects were identified. However, given that this chapter is concerned with conflict data only, 28 of those subjects (the two excluded are *contract management* and *dispute resolution tools*) are discussed as shown in Figure 5.6. A comparison was made of the percentage of the data or theme(s) which originated from each subject. The results show that the five main themes, since they obtained the highest percentages, are as follows: *delay in project progress or handover* (10%), *construction material* (9.3%), *payment* (8.9%), *performance and workmanship* (8.6%) and finally, *change at the construction phase* (6.3%). On the other hand, the lowest ranking five in percentage terms are *early cost estimation* (0.7%), *site selection and acquisition* (0.7%), *utilities service* (0.7%), *architect selection* (1.1%) and finally, *site investigation*, *tender cost estimation*, *tendering process*, *client's non- compliance* and *bid rigging*, which each obtained 1.5%.



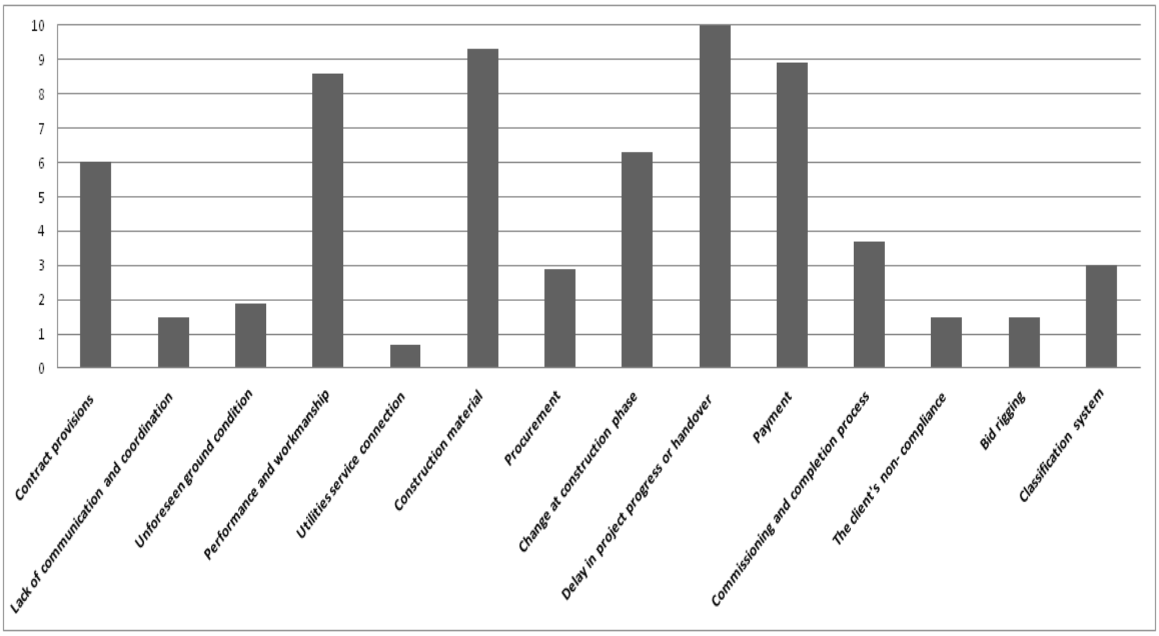


Figure 5.6: Comparison of the Conflict Data (Latent and Conflict) Collected Per Subject

5.3 Discussion and Analysis

5.3.1 Project Briefing

Three conflict themes, as shown in Table 5.2, were categorised as ‘Project briefing’. During the interviews, several participants declared that the project briefing process exercise which takes place at an early time during the pre-design phase had not managed to truly reflect the client’s project requirements and objectives. Consequently, some of these participants referred to conflict happening due to the emergence of new project owner requirements and objectives at a later phase. Where such changes - ‘variation orders’ – occur, additional time and expense is incurred in trying to fulfil the new requirements rather than implementing the original ones. The increased time and expense is especially felt in the construction phase. As an example, one project, PO14 was subject to the project owner changing his requirements and objectives at a later stage which resulted in a complete rejection of the design drawing made by the design consultant at an advanced stage of the design phase. This failure of the project briefing process was attributed by the interviewees to several reasons as indicated in Table 2.6. However, # (2a) seems to be a more important reason compared to the others as it obtained six data items from the interview survey as well as seven additional data items from the validation survey.

Table 5.2: Pre-design Phase Data: Project Briefing

#	Description of data	Class of data			Validation data
		Latent	Conflict	PM	
2a	The project owner was not fully clear on identifying project requirements and objectives.	**6**	_	**2**	**7**
32	The project owner was inexperienced and did not know how to proceed in terms of the project needs and requirements.	**2**	_	**1**	**2**
54	The information assembly during the design brief was ineffective.	**2**	_	**1**	**1**

This relationship between ‘project briefing’ and ‘variation orders’ was confirmed during the interview survey by six of the participants. Lack of a project briefing process exercise has been identified as an underlying or latent condition of conflict which triggered dysfunctional conflicts over 'variation orders' at a later phase. This relationship emphasises the importance of engaging in a thorough project briefing exercise at a time when any variation orders (change orders) that the project owner wishes to make can be accommodated in a flexible and rapid manner without incurring extra time and cost. In other words, clients face less costs as a result of requiring variations, if they introduce these at an early phase of the project life cycle (PLC) rather than the later phases.

Figure 5.7 demonstrates graphically the 'scope of cost' in relation to the project life cycle phases, from which it can be seen that the implementation of a variation order when a project is nearing completion would be disastrous in financial terms.

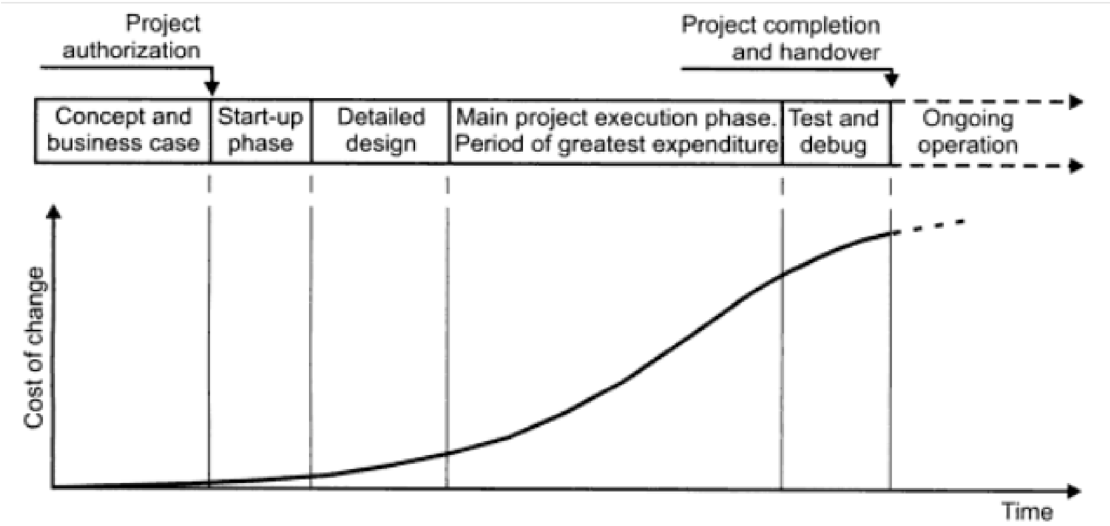


Figure 5.7: The Cost of a Given Change in Relation to Project Life Cycle Phases (Lock, 2007:404)

The importance of conducting an effective project briefing process to avoid extra time and cost accruing to the project is also described by a project consultant (JS12) in the following quotation:

> "The project owner and consultant [brief writer] should conduct an extensive briefing to identify accurately his actual needs and requirements before taking steps towards design development. It is important to minimise project owner thinking for modification later on in the project at the moment when a variation in orders could be expensive and time-consuming. This in turn would influence the relationship between the project parties and lead to intractable disputes." (JS12-05)

From the client's point of view, he should be fully aware of the importance of the project briefing process exercise, and therefore, his contribution during this exercise should be effective. As part of this, the project owner or his representative should establish adequate information about his project requirements and objectives, as far as possible. However, the process of preparing a brief is fraught with potential error or difficulty. The following quotations from some respondents during the interviews attest to this:

> "The project owner didn't know what he wanted exactly; his explanation about the project objective was not complete and accurate to us". [Design consultant] (R1-1)

> "The project proposal document indicates that our organisation representative who was involved at the project outset did not have enough experience". [Client representative] (Ab2-5)

> "He [the client representative] was not involved in the design briefing adequately nor did he know how to proceed; briefing information was still being given during the late design phase". [Design consultant] (FH19-14)

In addition, Chan et al (2010), in reviewing several studies on this point, highlight further errors or difficulties which may occur during the briefing process exercise. These include incomplete and inconsistent requirements and specifications, misunderstanding and misinterpretation of requirements, inadequate time allocated to briefing and finally, failure to allow stakeholders to be involved in preparation of the briefing.

Therefore, some interviewees echoed the demand found in the literature (see Chan, 2010; Kelly, 2008) for the improvement of the project briefing process exercise. This may be achieved through improving the capability of key personnel (usually the project owner and the brief writer - normally the architect) involved in the process. Some suggestions made by the participants concern the clients, most of whom generally do not have sufficient experience and struggle to determine their project requirements and objectives. Consequently, they may appoint client representatives with the relevant experience to act on their behalf. Additionally, the brief writer or architect should provide help to the project owner by making suggestions and offering architectural solutions to help in clarifying requirements and objectives. The following two suggestions made by a design consultant (FH19) and a client representative (EA20) relate to these two points:

> "The requirements and objectives of the project should be fully obvious during the pre-design phase. The project owner may appoint an experienced facilitator to help him; consequently, people who lack experience can be avoided". (FH19-15)

> "The designers [brief writers] in the briefing workshop should play their role fully with clients from two aspects. Firstly, they should effectively collect the entire information needed to produce a good project proposal document for the clients. Secondly, they should also effectively participate by querying and making suggestions to the clients. This would help to identify new requirements and functions of the project that may not occur to them during the briefing workshop". (EA20-14)

5.3.2 Early Cost Estimation

In the conflict analysis, two specific cases pertaining to 'inaccurate early cost estimation', which were classified as conflict in the latent condition (see Table 5.3), were identified by interviewees. The two participants concerned highlighted that inaccuracy in the cost estimation which is usually prepared at the pre-design stage by the project owner's organisation or project team, can provoke dysfunctional conflict later on, since it can mislead any future estimates. Indeed, the estimation at the pre-design stage often becomes the basis upon which all future estimates are judged, particularly the contractor's tender, which is given at the tendering phase. In both examples, ultimately this inaccuracy provoked dysfunctional relations between the project owner and the contractor, resulting in conflict during the construction phase over who would pay the extra cost which had emerged and needed to be covered (see Section 5.3.21).

Table 5.3: Pre-design Phase Date: Early Cost Estimation

#	Description of data	Class of data			Validation data
		Latent	Conflict	PM	
12	Inaccurate cost estimation at the pre-design phase.	2	_	2	2

Notably, both project cases, PO21 and PO22 (see Appendix F) dramatically exceeded the cost estimation at the end of the project, by 15% and 25 % respectively. The following is a statement of a client representative in the public sector (ST21) relating to this:

> "Our project early cost estimation was not accurate enough to enable us to complete the whole project because of the incorrect process of early cost estimation set out by the Ministry of Finance. For example: If a cost estimate is submitted to them, let us say 5 million, they may fund 3 million less. Our project faced the same problem. Consequently the cost estimation at the planning phase was appreciably unrealistic. This significantly misled the highly competitive contractors at the tendering stage into submitting unrealistic low bids. This ultimately led to problems in the quality of the design work, troubled operations and also project delay. Until now the project has been turned off and the contractor has apologised for not continuing because of the extra cost". (ST21-15)

Confirmation of this kind of problem is found in the literature. For example, Ciraci and Polat (2009) state that inaccurate early cost estimates can lead to lost opportunities, wasted development effort and lower-than-expected returns. They state also that it is often associated with a number of problems that may occur during the project process, including failure to award a construction contract because of excessively high bids, receipt of embarrassingly low bids, design problems, project delay and facilities with marginal to impaired operations. Therefore, the accuracy of cost estimates has been a major concern and a subject of much scrutiny. As a result, various quantitative methods have been established to enable estimators and business managers to objectively evaluate the accuracy of early estimates. Trost and Oberlender (2003) created one of these methods, producing a model to improve early estimates. They state that reliable cost data are often difficult to obtain during the conceptual stages of a project, particularly if basic design and geographic issues remain unresolved. The following comment from a client representative (MG22) was in agreement with this point, suggesting that in producing the basic design, the necessary steps should be taken to enable early cost estimation to be more accurate:

> "The cost estimation process should follow a regular sequence without being overstepped. Namely, only the cost estimate for the design budget should take place first; once the design is completed, an early cost estimation of the project should take place second for the construction phase and this estimate should be based at least on the basic design. It is certain that this method of cost estimation would be

> more accurate than the current method in which the initial project budget is determined in advance before the design is completed". (MG22-09)

However, when Ciraci and Polat (2009) examined the Trost and Oberlender models they came to the conclusion that none of the existing early estimation methods is truly aimed at providing the highest required level of accuracy. They made the point that the basic design of a building should be included within the planning stage at the pre-design phase in order to facilitate more accurate estimates. The same suggestions also emerged from client representatives, and can be seen in the following comment by a project manager who was involved in large projects and worked as a management consultant. Essentially, he argues that the basic design should be used to make more accurate early cost estimation, stating:

> "The preliminary design drawing should be included as an important element to help in estimating the project cost; this is the reason for the inaccurate budgeting of the project". (M03-5/PM)

5.3.3 Site Selection and Acquisition

In two of the case studies, two client representatives did not have a clear idea about the project site during the pre-design phase. Both of them selected and approved a project site much later, at the beginning of the construction phases (see Table 5.4).

Table 5.4: Pre-design Phase Data: Project Site Selection and Acquisition

#	Description of data	Class of data			Validation data
		Latent	Conflict	PM	
77	The project owner was too late in selecting and gaining ownership of a proper project site.	2	-	1	1

The above data typically demonstrate that the late selection of a proper building site is a problem leading to project delay during the construction phase (see Section 5.3.24 (#74)). One particular project, carried out by a contractor (Ak13), highlights this type of conflict where building sites are acquired outside the constraints of the project schedule:

> "Two years were allocated for all medical centres to be finished; however, during the first year most building sites had not yet been selected by the project sponsor [Public sector]. Moreover, some selected sites were moved to another location. For example, some were in small areas and so were not suitable as building areas. We [the contractor] were kept waiting for a long time for them to start the job". (Ak13-05)

It is important that the project owner defines the objectives and site requirements of the facility to be constructed as soon as possible, ideally, in parallel with the feasibility study. The reason behind this is to ensure that the selected site meets these objectives and requirements (CIB, 2010).The following comment from a project consultant illustrates this well; it is also interesting to note the proactive attitude of the project owner/client representative:

> "The project owner should, as early as possible, before the start of the bidding process, prepare a statement of objectives/requirements for the building that he wants to be constructed. In this way, he would not be surprised later, whether at the design or construction phase, when the selected building site does not correspond with the set objectives for the building. In our case, just as we were about to start, the project owner suddenly realised that the building site was not appropriate and since the project location had to be changed, two main problems occurred. Firstly, there was a serious delay to the start of the project as we waited for the project owner to select and own a new project site. Secondly, further effort was required for the new bid evaluation and resubmission to be made more consistent with new site conditions. All of these changes in circumstances needed to be agreed once more and that was not the case". (JS12-05)

Clearly, from the theme as described above it can be argued that site selection and acquisition should be dealt with during the pre-bid stage, which can be placed firmly within the client's sphere of responsibility. If a contractor is drawn into a bid process without being able to resolve this issue, he may become involved in a process which is flawed by a major omission. Once the bid has been submitted, it is too late to make a rebid for the project to include that major omission.

5.3.4 Site Investigation

In four of the case studies, the conflict analysis revealed that inaccuracies of a factual nature in the geotechnical report often lead to dysfunctional conflict in the construction phase. Statistical analysis confirms a significant association at 0.0003 between this variation and # 17 in the data table 5.3.19: "There was a dispute due to unforeseen ground conditions or foundation problems during the construction phase". Table 5.5 indicates this theme with six data validations coming from the Validation Survey.

Table 5.5: Pre-design Phase Data: Site Investigation

#	Description of data	Class of data			Validation data
		Latent	Conflict	PM	
66	The geotechnical report was not factual.	4	_	_	6
113	Considering the uncertainty associated with unforeseen sub-surface conditions of the project site in the PWC contract.	_	_	3	

Conflict in these circumstances occurs particularly during excavation, when unexpected soil conditions may be encountered requiring a costly major structure design change or an improvement to the ground to overcome the condition. In this respect, one consultant commented:

> "During excavation for securing the foundation of the building, it became clear to us that the soil's bearing capacity was not enough for the initial design load. We, therefore, changed the structural design to another one with larger foundations which required additional excavation work, and all of that incurred additional cost". (HS23-12)

Similarly, another commentator (public client representative) reported:

> "As we started the excavation work and after some metres, we found some sub-surface cavities. As a result it became necessary to use mat foundations instead of the traditional design … if we had been in possession of adequate data about the soil condition during the design phase, we could have avoided that change and the extra cost associated with the mat foundation". (Y9-39)

However, contract clauses may or may not clearly provide both substance and procedure for determining the responsibility for dealing with this kind of problem. For example, in the PWC contracting contract, particularly clause 10 (*Site viewing),* the owner (public client) transfers the liability of consequences of unexpected ground condition to the contractor. That is, the public representative expects the contractor to perform a site or geotechnical investigation then review the structural design or foundation based upon the geotechnical report before submission of the tender. Since this scenario is not always possible during tendering stage due to the way that the tendering procedure is drawn up, the contract is more often than not concluded on the basis of uncertainty. Subsequently, during the realisation phase of a contract, the agreed cost will become the subject of dispute at the moment that the first uncertainties occur (Saveur, 2003).

Additionally, that same uncertainty can arise when the clients, rather than the contractors, hire a geotechnical engineer to perform a site investigation and produce a geotechnical report during the pre-design phase. The validity of this geotechnical data is important to the structural design of the building or foundations and the responsibility for this can, therefore, be determined as belonging to the geotechnical engineer and the designer who is fundamentally responsible for the correctness of the data, rather than the contractor. It is the contractor however who is first affected by any failure to provide accurate data on sub-surface conditions: a situation which may necessitate extensive revision of the agreed design (Hatem, 1998, cited in Jones, 1990).

Finally, Gould (1995) recommends, for the purposes of minimising disputes and their impact, and trying to solve the problem before it escalates into something much larger, that the contractor and project owner must recognise early on when a 'valid' different soil condition (DSC) is encountered. However, because contractors and clients may not agree over how to define a valid DSC and how to deal contractually with these unanticipated soil conditions, Gould (1995) further recommends producing a well-written Geotechnical Design Summary Report **(**GDSR) in order to provide a clear baseline for judging the validity of a DSC as well as ensuring that bidders have a realistic understanding of the job during the tendering phase.

5.3.5 Architect Selection

The data described in Table 5.6 are consistent with the assumption that the better the procedure for selecting an architect to produce a good design, the better the construction project results will be for the client. The conflict analysis revealed that selecting a competent architect who can produce a good design plays a vital role in reducing possible conflict. This data was classified as a latent or underlying condition which might develop into a perceived, felt or manifest conflict in the design or/and construction phases. The table indicates that three latent condition data items were collected initially during the interview, with four extra data being added to this number during the Validation Survey exercise.

Table 5.6: Pre-design Phase Data: Architect Selection

#	Description of data	Class of data			Validation data
		Latent	Conflict	PM	
50	The architect was not competent enough to produce good design work.	3	_	_	4
63	To change the design tender selection process of a qualification-based selection rather than one based on lowest price.	_	_	1	_

The selection of an architect is usually performed by the project owner with the help of his project manager. Skitmore et al (2001) argue that this is one of the most important decisions when undertaking a building project. They state that the architect selection procedure has a direct impact on the quality of the design, which can lead, in the best of all possible worlds, to pleasing structures and facilities. Thus, the secret to a successful project lies in the professional, business, and personal relationship between the project owner and the architect.

It should be noted that the preferred project owner procedure for selecting an architect is sometimes not free choice, but is rather subjected to a number of criteria such as project owner objectives. For example, Government Tenders and Procurements (GTP, 2007),*(article 6),* requires the public project owner in Saudi Arabia to apply a competitive procedure whereby several candidates submit offers and the one offering the lowest price is selected, (*article 20)*, rather than a direct selection procedure where a single architect is considered. This approach is favoured to satisfy certain objectives such as preventing any impact from self-interest, avoiding inequitable opportunities for competitors, and also to protect public funds. However, many writers such as Gronroos (1984), Lathem (1994), and the AIBC (1998, as cited in Skitmore et al, 2001) have argued that this practice is not appropriate for the provision of services because any form of price competition drives fee levels down, thus reducing the quality of services provided.

The following comment made by a client representative provides a good illustration of how the impact of the competition-based selection procedure used in the public sector is provoking conflict in the design or/and construction phase:

> "The architect selection is one of the most important decisions made by the client, but unfortunately, a lot of government organisations [public clients] are adopting a competition procedure and then selecting the lowest priced offer. This will, of course, leave the competition open for both qualified and non-qualified architects. Consequently, qualified architects will be ousted from the competition because they cannot cope with low-priced bids tendered by non-qualified architects. As a result, designs of poor quality are produced which can be the cause of conflict in the design and construction phase". (S4-11)

However, it is indicated in the data that since the project owner is interested in guaranteeing the quality of the architect's services, he may perhaps consider direct selection, especially when undertaking a large building project where Qualification Based Selection (QBS) can be applied. This is a process that enables the project project owner to obtain good quality of service at a reasonable cost (CEC/PA, 2000), a fact which has been recognised or recommended by one of the client representatives (S4) in this study, and elsewhere in various professional groups such as the American Bar Association, the American Public Works Association, and the Architectural Institute of British Colombia. Furthermore, QBS provides additional services before, during, and after the basic services have been undertaken. Such additional services may result from the complexities of a project; for example, professional services may be required when investigating alternative solutions. This is where the design professional can make a contribution, by using his/her experience and knowledge to educate those who may not fully grasp the complexities of a project (CEC/D, 2000). The primary aim of QBS is to provide protection for the client, working to ensure safety, high quality and good value in terms of both design and construction of buildings. Through QBS, advice and information can be sought from experts with the assurance of objectivity (CEC/D, 2000).

5.3.6 Utilities Service

The research data have revealed several antecedents of conflict (latent condition) leading to a number of perceived felt and manifest conflicts occurring in the construction phase, as indicated in Table 5.7. At this phase of the project, the roles of project planners, including the project owner and design team, were clearly identified to work in utilities from a very early stage in the project as well as to co-ordinate with the utilities agencies or the local authority to avoid any possible project delay. However, there was genuine difficulty in some cases, particularly for projects PO20 and PO26, when the design team could not find an 'as-built drawing' to indicate utilities connection points and the contractor also struggled to find one during the construction phase.

Table 5.7: Pre-construction Phase Data (Design Phase): Utilities Service

#	Description of data	Class of data			Validation data
		Latent	Conflict	PM	
87	The utilities services were not available at the project site.	1	-	-	2
21	The architect did not include the utilities services connection data in the design drawing/document.	1	-	2	4
55	The utilities services connection points were not indicated within the design drawing/document.	2	-	1	2
78	The utilities connection expenses were not included in the contract document.	1	-	-	2

It has been pointed out that clients should organise with utilities agencies or the local authority during the design phase, in order to make the utilities services available at the project site. In addition, it has been argued that the design team should always perform a site visit to become familiar with the location of utilities services, and that only when these locations have been properly identified, and an as-built drawing has also been provided (especially in extension building projects), should the preliminary design begin. At this point the project team, including the client, can have a clear idea at the earliest opportunity of the potential obstacles that may be faced by the contractor as well as additional cost which may be incurred during the construction phase when attempting to connect the utilities to the facility/building. One particular project, carried out by client representative E20, highlights this point well:

> “The absence of utilities data within the design drawing resulted in a situation whereby the design team and the project owner did not have a full idea of some of the problems that might be faced by the contractor during the construction. Actually he [contractor] tried to connect the utilities services of the facility with utilities connection points located in the area. But that required incurring an extra cost and effort which were beyond the contractor’s consideration particularly at the time he submitted his tender. Consequently, a conflict occurred between the contractor and the project owner over who would underwrite this extra cost. (EA20-18)

Another example by client representative MG22 outlines the risk associated with preparing unknown utilities data, resulting in an inaccurate contractual document which could later become contentious regarding finance between the contractor and the client:

> “There was a problem concerning the cost of connecting the electrical utility to the utility in the surrounding area which was unexpectedly expensive as it was going to cost over three million SR. This amount was not anticipated in the contract; in particular, it was not included in the bill of quantity. As a result, an acrimonious dispute took place with the contractor who was deemed responsible and was expected to pay these expenses”. (MG22-05)

Notably, the conflict analysis reveals that some of the project cases, namely PO9, PO20, PO22 and PO26, suffered from unexpected and considerable extra costs associated with unknown utilities data as they did not identify sufficient utilities information at the pre-design phase. In addition, a second possible cause of project delay may also occur, as it did in AK13’s case, due to an unexpected problem with the utilities location. However, both problems reveal that it is important to try to make utilities data available before the detailed design works appear. It is also important to include clauses in the project agreement addressing any possible additional time and/or cost that may occur as a result of expected and/or external events that may happen in regard to the connection of utilities services. The following comment made by a client representative, relates to this point:

> “The design drawings must include utilities data showing how the facility can be connected to the connection points in the area and this must be detailed”. (EA20-17)

5.3.7 Design team: Communication and Co-ordination

The process of communication and co-ordination involving the integration of the design team members at the design phase has been referred to as being a latent condition and may lead to several forms of perceived, felt or manifest conflicts in the construction phase. This occurred in three project cases, namely PO9, PO25, and PO26, in which the research participants pointed out a lack of co-ordination in the communication between the architect and structural engineer as well as the supplier in respect of checking the design solutions of the building (see Table 5.8).

Table 5.8: Pre-construction Phase (Design Phase): Design Team Communication and Co-ordination

#	Description of data	Class of data			Validation data
		Latent	Conflict	PM	
58	Form regular meetings in the design development phase within/between design team members.	-		2	-
62	There was a lack of co-ordination and communication between the architect and structural engineer or supplier.	3	-	-	3
22	Early liaison between the architect and suppliers/manufacturers to check architectural design solutions for materials/machines installation.	-	-	2	-

For this reason some of the participants also pointed out that in design activities, especially in large projects, consistent and regular meetings within or between design team members should take place. This would provide a platform for promoting openness and teamwork to exchange and share the design information as well as to check and resolve design issues and problems. The following comment by a client representative emphasises the importance of this exercise to avoid any problems which may occur during the construction phase:

> “The lack of co-ordination between the architects and other team members, particularly the structural engineer, can lead to many problems during the construction phase. The architect may want to implement a particular architectural design without considering the

> structural design implications as well. This makes the matter even worse if the contractor approves the design drawing without making the necessary review. Similarly, problems can occur between the mechanical and electrical engineers and the main architect. Furthermore, the architect may come up with a design solution derived from his imagination which cannot be realised by the contractor. This, in turn, may lead to some problems in the construction phase". (Y9-40)

Notably, it is well documented in the literature that emphasis is placed on the importance and advantages of co-ordinating and integrating design team meetings; for example, Elvin (2003) states that this approach would improve the quality, speed up the production and lower the costs of projects. In fact, the lack of communication and co-ordination was evidenced in the case of PO9, where the contractor faced difficulty finding a sub-contractor to supply and install some mechanical and electrical machinery in accordance with the 'uncommon' architect design (see data #41). Consequently, he accepted whatever machines he could obtain regardless of the quality at whatever cost. This particular case caused conflict in two projects:

> "Chiller machines were supplied after the structural work of the building roof had been finished. But unfortunately it was revealed that the structural design of the building was not able to support such a load, therefore, it was necessary to change the structural design to make the roof of the building bear all the weight". (SS26-16)

> "Lack of communication and co-ordination between the designer and the suppliers … this was rejected by most of the suppliers who pointed out that there was difficulty installing these machines". (Y9-16)

Thus, it would appear that holding regular meetings would be a useful means of bringing these people together to exchange experiences, as most projects involve more than one design discipline which can lead to design problems unless early feedback is provided by other disciplines as soon as possible. Additionally, it would also be useful to involve suppliers in these meetings, particularly meetings between design teams and electrical and mechanical equipment suppliers to check design solutions for machine installations. Failure to do so might result in technical problems occurring which could affect the design. Ultimately, although each team member might be keen to meet the design guidelines, it is important to ensure that the team benefits from resolving any conflicts quickly at the lowest possible level of the organisation.

5.3.8 Design Faults

Table 5.9 shows the nine latent instances of conflict that were gathered from the interviews, presented in four forms concerned with design drawing faults. All of these design faults were the direct source of various dysfunctional conflicts occurring during the construction phase. In addition, a total of eight conflict data items were also collected from the Validation Survey in this category where all four conflict data type items are grouped together.

Table 5.9: Pre-construction Phase Data (Design Phase): Design Faults

#	Description of data	Class of data			Validation data
		Latent	Conflict	PM	
41	Error(s) or some architectural design solutions were not compatible with the shop drawing at the design phase.	2	-	-	2
11	The architect missed (omission) or did not complete some architectural element or detail in the design drawing.	3	-	-	1
45	The structural design was not compatible with the architectural design.	2	-	-	2
14	The architectural design contained some errors.	2	-	-	3
69	The need to select the best 'qualified' architect rather than lowest price one.	-	-	1	-

Some interviewees pointed out a number of factors attributed to faults in design drawing. Some of these are mentioned in several sections in this chapter, namely: designers' competency (Section 5.3.5), pressure of time to produce working drawings (Section 5.3.11), and lack of communication and co-ordination between design team members (Section 5.3.7). Fault(s) or poor quality in design drawings are sensitive and could have unpleasant or serious consequences that impact upon the relationship between project parties, since the design drawing is not an independent document but rather a set of associated forms which are used as a basis for the other contract documents. Therefore, any design fault is likely to mislead the other documents, especially BOQ and specifications (see section 5.3.10), which is ultimately likely to mislead the construction process, causing extra time and cost to be incurred. In addition, in the construction phase the situation becomes even worse, since any design correction resulting from faulty design may lead to a significant and direct extra time and cost. Tilley et al. (2000) underline this point, citing flaws in both documents and designs as factors which frequently cause variations to be made and work to be re-done, leading to extra expense incurred.

An example of one particular project, carried out by client representative Y9, highlights well how incomplete and faulty design caused conflict as a consequences of significant change orders and extra cost:

> "This building is steel frame structure which means that it can experience vertical and horizontal shaking. This in turn means that there must be technical criteria for the installation of a false ceiling to avoid high reflection. When we looked at the structure drawings we found that the architect hadn't completed the design of this false ceiling but instead he referred this task to the sub-contractor as an integral part of his work. At the same time the designer designed a space of steel frame at an altitude that doesn't match with the technical criteria of the false ceiling. This incompleteness and fault of the design led to a lot of change orders and accompanying cost." (Y9-12)

Ransom (1987) also indicates the extent to which poor quality of design contributes to the failure of projects. Ransom examined the causes which make projects fail, finding the following: faulty design (58%), poor execution (35%), use of poor materials (12%), and unexpected user requirements (1%). Notably, faulty design was taken to include all cases where the failure could be attributed to not following the established design criteria (Bubshait, 1999).Therefore, as part of the solution to this problem, several research works state that clients should pay great attention to architect selection to ensure that professional services of design drawing and other documents will be provided. The quality of these services is generally determined, as indicated by Tilley (2000), and Bubshait (1998), by design fees: it is suggested that where designers are selected on the basis of low design fees, then the level and quality of the service provided is likely to be limited and generally translates into additional project costs to the owner. The following comment made by experienced client representative S4 highlights this issue:

> "The dispute in the design phase is not common. However, it is common in the construction phase because of some design

deficiencies such as errors, ambiguity, and lack of detail. They are significant reasons to make a lawsuit … unfortunately, a lot of departments in the public sector go to the architect with the lowest price, although this does not necessarily lead to good services nor get an architect with good qualifications". (S4-5)

5.3.9 Design Change

As shown in Table 5.10, there are a number of latent conditions as well as perceived, felt and manifest conflict data, due to design change. In addition to those identified by the interviewees, another five additional data items emerged from the Validation Survey exercise.

Table 5.10: Pre-construction Data (Design Phase): Design Change

#	Description of data	Class of data			Validation data
		Latent	Conflict	PM	
D21	The project owner at the design development phase asked the architect to make design change(s).	4	4	_	4
70	The project owner rejected or did not approve in writing his change(s) order over some aspects of design at the design development or completion stage.	_	2	_	1

These conflict data represent disagreements centred upon two things: firstly, there is the client's desire or perspective being at odds with that of the designer's in terms of whether or not some aspect of the building design should undergo a major change or reworking at an advanced stage of the design development or at completion; and secondly, there is the rejection of, or failure to approve in writing, the change design request made by the clients which led to a demand for additional fees to be paid as a result of extra design service associated with these change requests. Statistical analysis gives confirmation of this relationship as indicated by P = 0.0053 of a significant association between data # D21in the table above where it is stated "The project owner at the design development phase asked the architect to make design change(s)" with data #101 in Table 5.26 where it is stated "There was a disagreement over the payment of additional compensation to the architect agent/firm".

In the cases here, the research participants attributed the occurrence of these design changes at this advanced stage of the design to several things. These are: the brief period of time devoted to the design, the client's exercise of an unclear brief regarding his objectives and requirements, overlap in the scope of work between the project owner and the architect, and a project owner lacking in experience. Consequently, perhaps it is better to address in detail how to deal with design changes in advance during the pre-design phase, at a time when contractual agreement for the design is taking place. This is when the project owner and designer could agree to allow for potential design changes to be made and scrutinise the scope of change and any associated extra fees as a result of any change request which may occur. This would make each party aware in advance of his obligations in case of disagreement between the project owner and the architect agent. Unfortunately, however, even these precautions are sometimes not sufficient to prevent conflict. The following comment made by an architect agent, AD27, demonstrates this type of conflict which concerns the non-compliance of a project owner despite the presence of contractual provisions for design change:

> "For small projects where the design work is not so complex, we [architects] do not have so much of a problem with design change orders issued by the project owner at the design development stage. We usually acquiesce in this situation and do not demand any additional fees on top of the contractual cost. However, the problem occurs in the following phase when the final approval takes place, specifically after obtaining the council's licence … In the contract, design change orders at this stage will incur additional fees but, unfortunately, the project owner does not always comply with the contract, assigning to himself the right to make changes without incurring additional fees even after he has given his final approval of the design". (AD27-09)

Generally, it is difficult for both clients and architects to devise a specific method to assess the reasons for design change. Many research studies (eg Lu et al, 2004) have acknowledged that design change is inevitable, suggesting that since there are many constraints in place, perfect design is therefore unrealistic (Wu et al, 2005). Conducting a good project briefing perhaps, as revealed in section 5.3.1, plays an important role in minimising these changes. In spite of this, a project briefing exercise would not fully prevent design change at the design development stage, for various reasons including those given previously.

A major design change issued by a project owner sometimes leads to relationship failure between the project owner and designer, unless the contractual agreement can accommodate some or all of these new requirements. Therefore, it is important for the purposes of conflict analysis to enable the project owner to distinguish between design changes that are regarded as formal and constructive in nature, and those that are seen as informal or cordial changes. Furthermore, there is a need to classify the reasons for design change to help the designer to ascertain whether he has full or partial responsibility or indeed does not have any responsibility to act when the question of design change arises. A design consultant, FH19, underlined this point and suggested that it should be included in the Saudi Arabian standard form of contract for engineering and consultancy services (design) when he said:

> "Because eht PWC design contract is a capitulation contract, the project owner is using his power by imposing his opinion on design change which may sometimes be incorrect, as in our case. At the same time, the contract calls for the designer to conceive a product that is free from defect. This overlap of the scope of the work and concomitant responsibilities caused a serious problem and strained the relationship between the parties. It resulted in a lot of argument which ultimately led to a reworking of the design work. This would not have happened if specifications had been inserted into the contract stipulating exactly the permitted scope of the design change and the designer's responsibility towards it". (FH19-10)

5.3.10 Ambiguities and Discrepancies

Table 5.11 shows the five types of conflict data classified as *ambiguities and discrepancies.* These present ambiguities and discrepancies within or between the three main design documents, namely design drawings, specification, and bill of quantity. Notably, among these data, two types of conflict had significantly high frequencies (#72 and #89).

Table 5.11: Pre-construction Phase Data (Design Phase): Ambiguities and Discrepancies

#	Description of data	Class of data			Validation data
		Latent	Conflict	PM	

42	The need to establish common construction law to address any contractual document deficiencies.	_	_	1	_
72	There was a discrepancy or inconsistency between bill of quantities document and design drawings.	5	_	2	5
23	Some project specifications were inconsistent with design drawings.	1	1	_	5
44	Some project specification descriptions conflicted with bill of quantities document.	2	_	1	1
89	Ambiguous specifications document resulted in different interpretations by the project parties.	7	1	4	6
39	There were two measurement methods (inconsistency) in bill of quantities document.	1	1	_	5

All of these data including the other conflict data tend to be centred around three conflict issues: Firstly, ‘Discrepancies in and between design drawings, specification and bill of quantity (DSB) documents’ (see data # 72, 23 and 44); secondly, ‘Ambiguous specifications’ (see data # 89); and thirdly ‘Inconsistency of measurement methods within bill of quantities document’ (see data #39).

However, the impact of the first issues as revealed by the research participants is various and associated with a number of conflicts. The statistical analysis revealed that a significant association was to be found at P= 0.0034 and at P = 0.0003 respectively between the first classification of data (data # 72, 23 and 44), and data number 102, where it was stated ‘Disagreement over what kind of materials specifications should be supplied to meet the building design’ (see Section 5.3.21), and data number # 72 alone in this table with data number 51, ‘Conflicts due to emerging new requirements of construction materials /components which were not originally in the bill of quantity document’ (see section 5.3.21).

Several other associated problems related to cost increases and delays were the result of these deficiencies in DSB documents. Related examples provided by some research participants are summarised below:

> “The specification document related to an item of material that had to be made of steel as we wanted [sub-contractor], but in the design drawing document related to the same item, it was required to be made of aluminium, as the main contractor wanted. This was a cause of conflict as the cost of aluminium is about three times the cost of steel”. (EM16-01)

> “For example: a description of a Surgical Panel in the bill of quantity document was referred back to the design drawing document. As described, it usually cost no more than two thousand SR while the same item in the specifications document cost 47 thousand”. (L10-06)

> “There were different descriptions for particular construction materials in the bills of quantity document when compared with the specification document. In our case the contractor insisted that the bills of quantity supersede the specification documents whereas the project owner took the opposite view” (Y9-32).

However, there is a general belief , expressed by authors such as Callahan (2005), and Uher and Davenport (2009), that the various documents containing drawings, specifications and bills of quantity have never achieved perfection and would normally include some errors, flawed descriptions, discrepancies or conflicting information. This is due to the fact that every building is a unique and complex entity. A drawing is merely a small-scale representation of what is expected to be constructed. Design decisions and details are spread out over hundreds of sheets containing detailed schedules. There are hundreds of pages of specifications, all of which need to be co-ordinated with each other and so on (Callahan, 2005). A sub-contractor also expressed the same belief:

> “There is no perfect contractual document and no perfect design because both of them are human products and any human product has potential errors. But the number of these errors varies according to the degree of professionalism of the contract and the creator of the design documents”. (SS26-18)

Similarly, the impact of the second issue also led to several conflicts. Ambiguities within a specifications document cause the project parties to have different interpretations of which construction materials or machines should be supplied or used in the project. The next two examples of this type of conflict are illustrated by a project owner and main contractor respectively as follows:

> "During the project construction phase, the contractor provided a number of marble samples to us [client] to choose from and approve for installation on the building facades; we noticed that all the samples provided were of cheap quality despite the fact that in the Bill of Quantity, we specified a better quality. The contractor claimed that the product he offered was consistent with the required quality as priced in the tendering document. This resulted in a dispute caused by ambiguity in the specifications which led to each party interpreting the specifications differently". (MG22-11)

> "There was a dispute between me [contractor] and the project owner about the interpretation of the word 'silver' which was listed in the BOQ and specification document to describe one of the construction material items. My interpretation of this word referred to the item in terms of colour only but the interpretation of the project owner was that the word 'silver' referred to the actual metal and not the colour. The intention of this illogical interpretation, from the contractor's point of view, was to pressurise him into waiving the extra cost resulting from some previous change orders". (HS23-19)

During the tendering phase, according to the PWC contract *Article (10) Section 10.2*, the contractor is required to review the design plans which include the design drawing, BOQ and specifications documents, and notify the project owner if any ambiguities or discrepancies are contained within them. On the other hand however, there are no further articles in the same contract explaining how to deal with such ambiguities or discrepancies as and when they are discovered by the contractor, especially at the construction phase when these materials should normally be supplied. As a result, the two opposing parties, in the event of a disagreement, cannot revert to a common law or rule to resolve the problem. Likewise, when any of these documents is subjected to more than one interpretation by the two opposing parties, they are deemed to be ambiguous. This lack of clarity to be found in details of common law is outlined below by a design consultant who states:

> "An authorised set of common construction laws or rules relating to the Saudi Arabian construction industry should be established to be used by both construction industry participants and attorneys to sort out any unsolved problems encompassing different interpretations of specifications and/or DSB discrepancies". (AS24-11)

5.3.11 Design Delay

Table 5.12 indicates a number of themes addressing the timing of project planning and designs as a main concern. Three other conflict data have been identified as perceived and felt within these themes as well as a further four conflict data items, identified and then classified as being latent conditions. However, they each centre on two particular aspects, namely, ‘delay in completion’ and ‘delay in progress’.

Table 5.12: Pre-construction Phase Data (Design Phase): Design Delay

#	Description of data	Class of data			Validation data
		Latent	Conflict	PM	
56	Insufficient time was given to the architect to develop all design drawings /documents.	2	-	-	3
61	The need to give the architect sufficient time to develop good design drawings/ document.	-	-	1	-
67	Disagreement over not finishing design document on time.	-	2	-	3
92	Lack of project owner effectiveness was a reason for the architect design schedule to be delayed.	2	1	-	2

As revealed by a number of participants, if architects have insufficient time and fees to carry out their work, perhaps clients cannot be provided with the necessary level of services, and rather receive inadequate detail or poor production of design quality and documentation. Research respondent L10 highlights this clearly as a result of his experience from PO10, and recommends the following:

> “The designer should be given enough time for design completion otherwise it’s likely that mistakes and faults will occur within the design drawing. As a result, this may lead to serious change orders during the construction phase period. It can also cause a discrepancy between the design drawing specifications and the bill of quantity. This in turn, may lead to ordering quantities and specifications that are not stipulated in the contract which could become a source of conflict between the project owner and the contractor, or sometimes the sub-contractor”. (L10-5/PM)

On the other hand, the architect might be given sufficient time and money to salvage the design process. As part of the progression of this design process, the project owner is usually involved as an interim step for the purpose of allowing him to review and comment on design submissions prepared by the architect. However, he may interrupt the process in many ways such as by asking the architect to make some design changes, which may be either small or large. This process, as data analysis reveals, was not perfect in some projects, and indeed, it was interrupted as in PO14, PO27 and PO19. More specifically, it was frustrated in these projects by the following two issues, which ultimately led to dysfunctional conflicts due to delay in design progression:

- Lack of quick, effective interaction and communication between the public project owner and the architect; therefore, the architect's work was delayed.
- Transferral of authorisation to enable the forwarding of the design to a new public client representative where new decisions can be made after reviewing the design submission.

As a result of these issues, or others the project owner might share, there may be a delay in design progression or completion. That was obvious in project PO19 where two consecutive clients' representatives with different opinions over the design drawing were involved in the design process. The following comment made by design consultant FH19 was in reference to precisely this type of case, where a public organisation had referred the project architect to a new client representative at the design development stage:

> "The design drawings were due to be handed to a public client representative. When this representative was absent, his colleague took over and he refused to approve some new design elements in the design drawing which had been approved by the previous one. This matter compelled us to revise some design work which took additional work and time". (FH19-07)

5.3.12 Tender Cost Estimation

Underlying conditions of conflict connected with the tendering process are discussed in the section below; the conflict data included in Table 5.13 is additional to these. A certain amount of data which is placed in the table below was collected referring explicitly to the contractor cost estimation. All of these conflict data are described as latent conditions of conflict, two of them being associated with a particular project case, while the others came to light during the interviews in a non-case-specific way. However, the occurrence of unrealistic tender cost estimations was recognised explicitly as a cause of conflict in two projects in the Validation Survey.

Table 5.13: Pre-construction Phase Data: Tender Cost Estimation

#	Description of data	Class of data			Validation data
		Latent	Conflict	PM	
47	The tender price submitted by the contractor was accepted based on unrealistic cost estimation.	4	_	1	2

Tender cost estimation is a function performed at the tendering stage by the contractor to predict the costs of construction and provide a basis for submitting a tender sum for a project. Generally, as some of the research respondents have indicated, this kind of estimating is geared towards the pricing of bills of quantities. However, Law (1994) indicates that contractors devise their own methods of cost estimating and bidding (cited in Akintoye and Fitzgerald, 2000). A number of studies show that there are some major shortcomings in cost estimating which have been identified as causes of inaccurate cost estimates. During the interviews some of these causes are mentioned where conflict results at the construction stage, as shown below:

> "The bid document was not thoroughly examined by the contractor and as a result he submitted an offer with unrealistic cost". (MS18-05)

> "Lack of understanding of project requirements by the contractor; he undertakes the project to perform the project and encounters a number of problems". (S4-06)

> "Estimation of project costs was not based on an actual tender document analysis but based on the contractor's own experience and general procedure dictated by some software programme". (M3-04)

However, it seems that there are many other causes that lead the contractors to submit inaccurate tender cost estimates. The project owner or the project manager perhaps could avoid these causes or problem by effectively applying a more stringent administrative system for bidding which discourages the acceptance of any unrealistically low tender. Sub-contractor La15 made this suggestion as part of a project management strategy, stating:

> "To avoid conflict and disputes, the bid administration must not follow the current practice which is 'the lowest is the winner' but most importantly should exclude any offer/tender which has a cost

estimation less than the realistic cost of the project execution first; once this is done, the lowest tender price can be selected as a second step. It is necessary to have a clear list of project specifications and bill of quantity documents to avoid any mistakes in the cost estimation especially on the part of the bidders". (La15-19/PM)

5.3.13 Tendering Process

Table 5.14 indicates four items of data described as 'latent condition' in the tendering process category. This subject came to light during the interviews as an issue centred upon two important aspects, which are: 'tender price' and 'contractor selection'.

Table 5.14: Pre-construction Phase Data (Bidding and Award Phase): Tendering Process

#	Description of data	Class of data			Validation data
		Latent	Conflict	PM	
3	The 'lowest-price wins' tendering selection method has encouraged competitors not to evaluate the tender price carefully.	2	_	_	1
9	The 'lowest-price wins' as tendering selection method was a prime factor in not selecting a qualified architect or contractor.	2	_	_	_

As is well-known, tendering is a separate process which follows cost estimation, which can be described as a technical process or function undertaken to assess and predict the total cost of executing the project by using the available project information and resources (Kwakye, 1994, cited in Akintoye, 1998).

Many authors have indicated that cost estimating is crucial to tendering. It establishes a basis for contractors to set up the tender price for construction work which comprises a detailed analysis of the project and a detailed costing of those parts of the work to be done by the contractor at the tendering phase, plus mark-up, taking into consideration an allowance for general overhead recovery, profit, etc (Akintoye, 1998). However, during the tendering process, it is likely that competitive tendering may pose a serious risk of an erroneous evaluation of the tender price submitted by contractors, which as a consequence can lead to a situation whereby a contractor incurs losses on the contracts awarded by clients. The following two cases highlighted by respondents La15 and Js12 illustrate this particular scenario well; it is also interesting to note, within their comments, the criteria for the tendering process which were adapted for tender selection:

> "We entered into a competition to build a commercial building for the public sector. We evaluated the cost to prepare our [contractor] tender. We were the winning bidder as our offer was the lowest price. Unfortunately, later on we found out that our evaluation was not accurate and fell short of a realistic estimation of the total cost of execution. We tried to withdraw but they refused and now we are working on the project with a certainty that we will lose". (La15-20)
>
> "As the bidding competition for the contracting work started, we studied all the available information related to the project, especially the bill of quantity (BOQ) to calculate the project cost estimation. The estimation was around 38 million, and then we added 10% to the total as a markup. Surprisingly, after the tendering process, the winning bidder had asked for only 31 million which was totally unrealistic and much less than the actual cost of the project execution". (Js12-25/R)

In Saudi Arabian public project law where the Tender and Procurement Competition Law (2007) governs the tendering process, committees (comprising public client representatives) are requested to select tenders/offers submitted by contractors based on the lowest price (*Article 21*). Thus, there is a tendency to process bids and award contracts merely on the basis of comparing tender prices according to the principle of 'lowest-price wins'. Such a practice, as Wong et al (2001) and others have indicated, allows all tenderers to enter into tender competition without account being taken of other parameters (e.g. a contractor's financial soundness, management capabilities, technical expertise/capability etc.) during tender evaluation. It also poses a high risk to the project owner because there is an increased possibility of undesirable outcomes such as financial collapse of the contractor, unacceptable performance, delay in completion, time and cost over-runs and so on (Russell and Jaselskis, 1992; Kwakye, 1994; Holt et al, 1995, cited in Wong et al, 2001). The following quotations from three client representatives extracted from the research interviews represent the tendering process of 'lowest-price wins' as a procedure that can develop into serious problems in the design and construction phases:

"They were working on the basis of 'lowest cost' for selecting the designer without consideration of qualifications, resulting in the production of an unprofessional design". (N05-05)

"In the public sector the winning tender is the lowest priced one - not the one encompassing efficiency; this explains why many problems occur later". (D06-08)

"The tender administrator should give more priority to the criterion of efficiency rather than lowest cost in selecting a contractor; awarding the contract should reflect the market prices otherwise many problems can occur resulting in disputes that may end up in court". (T07-05)

5.3.14 Selecting a Construction Team

The tendering process and its potential for provoking conflict arising out of selection of an incompetent project team has already been discussed briefly in section 5.3.13. The research data pertaining to the selection of incompetent teams as a result of this process is shown in Table 5.15 below. This data can alternatively be classified together with data linked to the subject of 'performance and workmanship' in section 5.3.19. The table contains ten data items described as the latent conditions of conflicts which came to light during the interviews with senior project managers, plus seven data items which are seen as relating to project management strategy.

Table 5.15: Pre-construction Phase Data (Bidding and Award Phase): Selecting a Construction Team

#	Description of data	Class of data			Validation Data
		Latent	Conflict	PM	
28	Apply pre-qualification process during tendering phase.	_	_	4	_
35	An incompetent contractor was selected to perform the project.	6	_	1	2
19	The project consultant was not competent to fulfill his job.	2	_	_	2
7	An early provision of a list of sub-contractors by the main contractor after the tender had been awarded and before the construction phase gets started.	_	_	1	_

48	An incompetent sub-contractor was chosen to perform some work packages.	2	_	1	1

Furthermore, the selection of incompetent contractors, consultants and sub-contractors was also recognised as a potential and common underlying conflict condition in five projects in the Validation Survey.

As most of the project cases involve the application of the traditional design–bid–build procurement approach, the project manager usually helps the project owner to select and employ architects to create the design plan and specification, and then the architects themselves may subsequently be introduced as design consultants at the construction phase, participate in the selection of a main contractor and supervise his work. Subsequently, the main contractor may participate in the selection of sub-contractors and supervise their work. However, the research data suggest that, for some projects, the process of participant selection is not always carried out satisfactorily. This can be attributed to either a failure to adhere to, or carry out, effective selection criteria, or to the fact that the selection criteria are deficient in some way. However, pre-qualification is one of the processes highlighted by four research respondents (see data #28 in Data Table, Appendix D) and project management literature suggests that the checking in advance of different aspects of a contractor's capability at the time of tendering is not always carried out effectively. The following two comments made by design consultant AS26 and client representative Y09 respectively, suggest that pre-qualification should be applied at the time of the tendering process:

> "It is necessary to spend more time on prequalifying contractors and selecting the one who has very serious credentials. A contractor should not be selected without checking his capability, his experience, his reputation and his cost (of course) rather than just the lowest cost. This criterion alone does not qualify him to do the job. Therefore, it is important to select the contractor who has good experience even if he costs more money". (AS24-16)

> "Especially in a large project, the project owner should make prequalification assessments to avoid many serious problems which could happen during the construction phase parallel to the time of the tendering process. Contractors should provide additional documents associated with the tender providing information about their capability such as financial, managerial and technical resources and competence to execute the project". (Y09-38)

Selection of an inappropriate contractor for the job increases the chances of the project owner becoming dissatisfied and of project failure due to varied reasons including financial problems, poor management, over-commitment and/or conflicts, and disputes associated with construction activities (Doloi, 2009). Similarly, as the main contractor is responsible for completing and delivering the project on time, much of this work is performed by sub-contractors. Therefore, any occurrence of unsatisfactory performance on the part of a sub-contractor due to lack of capability would generate a project delay or the possibility of a serious dispute between the main contractor, sub-contractor and client, and may possibly involve other sub-contractors. An actual case illustrates this well, recounted by a design consultant (MS18):

> "At the beginning of the execution of the project we started the concrete work. We [as project owner and design consultant] noticed that the sub-contractor did not have the required quota of manpower as well as sufficient technical experience for the job (as part of our quality control procedure). Accordingly, we asked the main contractor to look after this matter by changing the sub-contractor to another one with sufficient capability so that poor work could be avoided at the next stage where any mistakes could have more serious consequences. Unfortunately, the main contractor had problems finding another one and so he decided to retain the sub-contractor. This created a problem between us and him and delayed the progress of the project which created another problem and a further subject for dispute". (MS18-07/C)

Selection of competent sub-contractors has been recognised as a complex task due to its ambiguity and difficulty in its formalisation (Arslan et al, 2007). This process is usually based on intuition and past experience and is carried out by the main contractor. Selection can be even more difficult and stressful when a limited time period is imposed for execution of the project. Thus, while interviewees M18 and AS24 are concerned with this issue of project delay, participant AS24 suggests that sub-contractor evaluation and the selection process should be performed before the construction phase starts to avoid any possibility of project delay. He states:

> "During the construction phase the contractor introduced a list of sub-contractors to us [as project owner and consultant] to carry out some work but we did not approve the majority of them because we believed that they were not competent enough. During the same period he [the main contractor] offered a number of building materials for approval but, we also did not approve them because they were not up to the required standard (in our opinion). This process took time and as a consequence caused a delay to the project at the construction

phase. The contractor claims that the delay resulted from our late decision-making. However, it is our belief that the delay was caused by the contractor not presenting us with a proper sub-contractor and good construction materials from the beginning. This was the subject of a dispute between us over who was responsible for the delay. However, this issue should have been sorted out earlier before the construction phase started". (AS24-10)

5.3.15 Contract Provisions

In Table 5.16, only a small amount of data (two items) was collected which was specifically related to defects in contract provision, and more especially PWC contracts, as issues involved in causing felt conflicts. The other conflict data was classified as 'latent conditions' since research participants criticised such defects, indicating that they often led to conflict because contracts were poor or lacked important contract provisions or conditions. However, since these data were not associated with specific case studies that provoked conflict in the project team, they have been included in the underlying latent condition data class, as indicated in the table below.

Table 5.16: Pre-construction Phase Data (Bidding and Award Phase): Contract Provisions

#	Description of data	Class of data			Validation Data
		Latent	Conflict	PM	
4	Due to unbalanced risk allocation of the PWC contract, conflict duly occurred.	3	_	_	3
34	Some of the contract conditions were unclear and had loopholes.	3	_	_	3
59	The PWC 'Public Work Contract' scope of work was ambiguous/overlapped.	3	2	_	1
75	Need to take note of the advantages of various professional international standards of contracts to improve the PWC contracts.	_	_	6	_
79	There was a conflict owing to a lack of contractual provisions to address proposed changes to orders.	2	_	1	3
65	Lack of contractual provision items addressing unexpected increases in prices of construction materials.	3	_	2	_

As can be noticed from the contractual areas identified as conflict data in the above table which relates to the PWC form of contract, the data are centred upon three particular aspects: the allocating of unfair contract risk, poor contract provisions, and lack of contract conditions. In general, these issues tended to relate to specific project cases but in fact they could be applicable (with other issues) to all new public projects in Saudi Arabia since contracts other than PCW contracts cannot be used. However, researchers including Al-Abedien (1995), Ibn Humiad (2005), Aleroan (2008), Arafh (2008), and Cowling (2011), have carried out evaluations of the PWC contract conditions in their entirety and come to the conclusion that the PWC contract needs radical change and improvement. Perhaps the most important study is the one conducted by a group of researchers including Al-Hammad, who, during an interview with Aljazirah newspaper in 2008, gave some examples of the research outcome:

> "For example, the PWC contract does not mention how to deal with contractors making late payments, the independent status of the engineer supervising the project, providing incentives for contractors who complete the project before the completion date … In addition, it does not mention how to deal with the inflation of construction material prices once the project is underway, nor does it address the subject of labourers' wages. A lot of these issues encourage the contractors to make administrative claims against government agencies to the Board of Grievances asking for financial compensation …These examples and others increase the risk of working with government agencies, which reflect back negatively on the national economy. They are the causes of the increasing costs of construction projects as a result of the practices described". (Al-Hammad, 2008)

Poor (or lack of proper) contract conditions are likely to be a source of conflict, especially when they are interpreted in a way that militates against parties who were not involved in the drafting of the contract. PO21 and PO26 are clear examples of this, where the project owner makes the contractor responsible for the impact of an unexpected increase of material costs and precludes him from recovery of additional costs. The situation may worsen when this kind of risk (of increased costs) is unfairly shifted to other parties who have no control over the situation. This is illustrated by the following comments by some interviewees who criticised the allocation of risk in PWC contracts which they describe as 'capitulation contracts':

> "The PWC is an unbalanced contract. You can say it is a capitulation contract … Contractually, contractors are obligated to take, probably,

> most of the risks while the project owner has nothing but the right to receive a good performance by the contractor". (MA8-02)
>
> "In other words, a capitulation or unbalanced contract simply takes care of one party's interest while neglecting the other party's interest". (Ab2-04)
>
> "PWC is a 'capitulation contract'; this means it is a contract that is not balanced and allows governmental agencies [public clients] to misuse their power. Additionally, it goes beyond the scope of work which finally leads to over work on the part of the contractor". (S4-02)

With such contracts, the project owner tends to pass contractual responsibility for most of the risks on to the contractor. However, this can result in these contractors or other project parties having to spend time and effort looking for ways to stay alive in the project, usually to the detriment of the project itself (Jannadia et al, 2000). Therefore, following various risk allocation principles as suggested by a number of researchers such as Kuesel (1979), Casey (1979), Abrahamson (1984), and Thompson and Perry (1992), with regard to contractual agreements, especially between the project owner and the contractor, it is important to avoid contractual dispute. Adopting these principles can form the basis for allocating risks and may be useful in reaching an equitable decision which would ultimately be beneficial to both owners and contractors (Lam et al, 2007).

5.3.16 Lack of Communication and Co-ordination

Lack of communication between the people who make up the project team, especially the contractors, clients and consultants, in the construction phase has been identified by some research interviewees as having a harmful effect on project performance and causing dysfunctional conflicts as indicated in Table 5.17.

Table 5.17: Construction Phase Data: Lack of Communication and Co-ordination

#	**Description of data**	**Class of data**			Validation Data
		Latent	Conflict	PM	
26	Lack of communication between the project participants/team members was a cause of some problems during the construction phase.	4	–	–	2

60	Involvement of the design team in construction team meetings.	_	_	2	_

This problem becomes an important issue in particular with large and complex projects, since the project team are distributed or decentralised geographically in different places during the project process yet at the same time, they must assume joint working responsibilities for the various aspects of the project (Wang and Anumba, 2008). Perhaps the central point that links these communication difficulties or disorders during the construction process with the resultant conflict is the extent of accuracy and appropriateness of information exchange between the members of the project construction team. Communication entails allowing people to 'send' and 'receive' information in many different ways: it can for example be verbal or non-verbal, very detailed and formal or with very little detail and no formal structure. However, if the communicated information goes missing, is error-ridden or is not received at the appropriate time, it may consequently lead to wrong or misinformed decisions or to no decisions being taken, which may have a harmful impact on project performance. The project data revealed several examples, summarised below, indicating this relationship between poor communication and project performance which became an issue of dispute:

> "There was a considerable design error discovered during the construction phase. This error had not been communicated to us in good time. As a result, the project performance was disrupted to solve this problem". (AH17-25)

> "There was a dispute between us [consultant] and the contractor over some aspect of the shop drawing. We discovered a problem with the shop drawing whereby the contractor started to cast some of the reinforced concrete without our approval. This was due to lack of communication". (AS24-05)

> "Before the project outset, the client's representative communicated verbally to the contractor where he wanted the front direction of the building to be. Then he came later after it had been completed and asked the contractor to make some remedial changes. If he [the client] had communicated with the contractor in step- by-step fashion this dispute would not have happened". (La15-12)

These examples illustrate the importance of having an effective communication method to avoid any miscommunication, monitor the progress of the project and resolve disputes at the appropriate time. Research respondents La15 and AS24 emphasised the importance of having regular construction site meetings between the members of the construction team as the main communication method. This method is already recognised and endorsed by authors such as Gorse and Emmitt (2003). Indeed, it may be the case that most of the cases studied here already included regular site meetings between construction team members. However, in addition, a well-designed system of communication is necessary.

Design consultant M03 and client representative N05 reveal that there is another significant aspect of miscommunication, which comes from the absence or infrequent attendance of design teams at construction site meetings. Section 5.3.8 discussed some examples of this whereby certain aspects of design were erroneous or incomplete due to lack of communication and co-ordination between construction specialists in the design phase. Similarly, respondents M03 and AS24 attested to miscommunication in the construction phase in traditionally-run projects, where the design teams were not integrated into the construction team and, therefore, project requirements could not be fully realised by the contractor or construction team:

> "The disputes between the design and contractor in our case never happened because he [designer] did not have any involvement in the construction process – his final action was the submission of the design document to the client. On the other hand, the client's requirements could not be fully realised by the contractor and that caused a dispute with the project owner". (M03-19)

> "Some of the design documents were not passed on to the contractor in a proper way. The designer should have visited the building site regularly and communicated with the contractor face to face to appreciate the entire design picture". (AS24-06)

Since the design and construction phases are, traditionally, separate activities, the resultant communication gap remains a distinct disadvantage of this approach. The designer can arguably claim that he was not on board sufficiently early to give advice about the constructability of the project design. On the other hand, the contractor can argue that the design had errors or was inadequately completed. In the event of a dispute, it is difficult to determine which party, designer or contractor, is responsible.

5.3.17 Contract Management

The following relates to a large project consultant:

> "The engineers especially those working in the public sector [client representatives] are usually not well trained in terms of how to manage the contract effectively. A lot of problems occur during the project, especially during the construction phase, which, if management of the contract were more effectively applied the chances of avoiding would be more possible". (D06-3).

Good and practical contract management was clearly underlined as a key management tool that proactively anticipates and responds to current and future project needs, with the result that many potential problems between the project parties may be prevented and resolved harmoniously (See Table 5.18).

Table 5.18: Construction Phase Data: Contract Management

#	Description of data	Class of data			Validation Data
		Latent	Conflict	PM	
82	Application of effective contract management.	–	–	3	–

In fact, the literature, such as that by the Office of Government Commerce (OGC) and elsewhere reveals that good contract management activities extend far further afield. These can be broadly grouped into three areas, as follows:

- **Service delivery management** ensures that the service is being delivered, as agreed, to the required level of performance and quality.
- **Relationship management** seeks to keep the relationship between the two parties open and constructive, aiming to resolve or ease tensions and identify problems early.
- **Contract administration** handles the formal governance of the contract and changes to the contract documentation (OGC, 2002).

However, it should be noted that these aspects of contract management would be daunting for anyone, and especially for the project management owner or consultant who is new to the process of contract administration. In addition, user-friendly guidelines such as those provided by the OGC (2002), also aim to help the public client's managers to understand these issues and take greater responsibility for managing long-term contractual arrangements with the service providers, especially with the contractors.

5.3.18 Unforeseen Ground Conditions

The five conflict data items (perceived, felt and manifest) in Table 5.19 that were identified in the interview exercise are complemented by a further five additional data from the Validation Survey, suggesting that this is a relatively important type of conflict in the construction phase of the project.

Table 5.19: Construction Phase Data: Unforeseen Ground Condition

#	Description of data	Class of data			Validation Data
		Latent	Conflict	PM	
17	There was a dispute due to unforeseen ground conditions or foundation problems during the construction phase.	_	5	_	5

As discovered earlier in section 5.3.4, there is a statistical association at a level of 0.0003% between the 'geotechnical report [which] was not factual' (my brackets) data # 66 as the latent condition of the conflict at the pre-design phase and some felt and manifest conflicts caused by 'unforeseen ground conditions' at the construction stage. The association between these conflict data was pointed out by several respondents (see section 5.3.4) during the interview survey. This link appears to be sound, since the ground investigation reports do not necessarily reflect the actual ground conditions due to a wide variety of possible imperfections in the condition of the soil, in its exploration and in the interpretation of the report.

In addition, this issue of conflict has been recognised in the literature by for example, Gould (1995) and others, as a significant and difficult item of risk or uncertainty since it may effectively have a major impact on the time and cost of the project and may be difficult to measure objectively, and would therefore be more difficult to deal with. Consequently, standard contract documents often tend to include some provision to determine contractually the allocation of this type of risk. Indeed, such a provision is a considerable factor in helping the bidders to avoid 'offering low price delivery for expensive work'. Nevertheless, in fact, this is not always the case, as contractors still face 'surprisingly' unusual physical conditions beyond reasonable expectations which make them feel aggrieved due to the sizeable extra time and costs incurred. Client representative ST21 describes a situation in project PO3 akin to the above:

> "Although there was a geotechnical investigatory report before the contractor at the start of the project, the contractor was surprised when he started the excavation work to find that the site was a place of soil burial. He therefore stopped the work and asked to negotiate with the city council [public client] about whether to increase funding to accommodate the extra cost of devising a new structural design for building foundations or change the project site". (ST21-11b)

However, the PWC contract favours the owner and disadvantages the contractor who is allocated total responsibility for checking ground conditions and expected to be fully familiar with all unforeseen conditions or circumstances as well as to produce the right structural design for the building foundations to suit the prevailing conditions before submitting his proposal (*PWC, Clause (10))*. Although this clause contradicts the concept of a fixed-price PWC, the contractors commonly accept this risk without a contingency plan in their proposal, expecting that it will not have a harmful impact but will only marginally affect the size of their profit. Likewise, without having this clause in the contractual agreement, the aggrieved contractor may claim misrepresentation to recover the cost of a defect, an unexpected occurrence, or a simple loss. On this point, Brewer (2007) states that reference must be made to the specific terms of a contract as a starting point in examining any such claims, although there is no standard way in which unforeseen ground condition claims may be resolved. Further, a contractor's recourse to law in such a situation depends upon several factors, including the conditions themselves, the investigations conducted, the contract itself, and subjective interpretation of a 'reasonable' response to the situation (Brewer, 2007).

5.3.19 Performance and Workmanship

Table 5.20 shows a significant number of conflicts (perceived, felt and manifest) as well as some strategy data (three) items, all classified under one title, namely performance and workmanship. The number of conflict data items as indicated in Table 5.20 below obtained during the main interview survey was 23, to which a further 12 data items obtained from the Validation Survey were added.

Table 5.20: Construction Phase Data: Performance and Workmanship

#	Description of data	Class of data			Validation Data
		Latent	Conflict	PM	
57	There were instances of poor performance in terms of methods of work, inadequate supervision, quality control or other factors on the part of the main contractor.	7	1	_	5
116	Early exclusion of the contractor or the sub-contractor as soon as signs of a poor level of performance and workmanship to project become apparent.	_	_	1	_
25	There were instances of poor performance by the sub-contractor.	_	2	_	2
18	There were instances of poor performance in terms of the methods of work, inadequate supervision, quality control or other factors on the part of the design consultant.	4	1	_	1
115	Regular evaluation of the consultant's performance.	_	_	1	_
91	One or more error (s) or defects occurred on the construction work.	_	4	_	1
109	There were some instances of sub-standard or low quality workmanship during the construction.	_	4	_	3
112	Main contractors should be contractually committed to forming a quality control team on a large project.	_	_	1	_

As the conflict causes indicated in Table 5.20 indicate problems during the construction phase, they tend to be centered upon the following areas: poor performance, errors or defects, and sub-standard workmanship. In addition, all of them indicate the client's dissatisfaction with the productivity of the other project building team, and in particular, the services provided by the consultant, main contractor and/or sub-contractor. However, during the interviews, the research participants attributed the occurrence of conflicts to several reasons which perhaps need to be examined closely by project managers and/or clients before ruling them out. The following comments are some examples:

> "After receiving the money and making a good profit, the contractor performed very poorly over the rest of the project". (M3-03)

> "The contractor's performance has been bad … since he submitted an offer with unrealistic costs". (MS18-05)

> "The incompetency of the contractor's engineers meant that some elements of the construction of the project lacked quality control and safety measures". (JS12-18b)

> "An incompetent sub-contractor was chosen to perform some work packages". (MS18-09)

When the client organisation appoints incompetent construction companies which employ unskilled personnel and labour without adequate training and supervision, poor performance and workmanship in construction are inevitable. Construction requires quality-consciousness at each stage of the project. A high standard of project specification is required at all times and this cannot be achieved through poor performance or workmanship, or through the use of faulty materials or materials of low quality. Equally, adopting a low budget which is usually accompanied by a low level of specification standards does not augur well for a successful conclusion. However, with a good contractor and sub-contractor meticulously adhering to high standards, work of excellent quality can be produced. Therefore, within this context, research respondent Y09 indicated the importance of setting up a quality control team, especially within a large project, to ensure that a certain level of quality can be accomplished in terms of the project's product or service. He states that it is necessary to:

> "Ensure that the main contractor is contractually committed to forming a quality control team to review and apply its principles". (Y9-25)

However, alternative views were presented by certain other research participants regarding project management. They point to increasing the chances of obtaining an appropriate level of performance and workmanship. One of the suggestions was that the clients or project managers should regularly evaluate the consultant's performance, as usually it is the contractor who is evaluated. Another suggestion was that the consultant should monitor and evaluate the work of both the contractor and sub-contractor while the contractor himself should monitor and supervise the work of the sub-contractor. This can be done through the consultant arranging site visits on a regular basis to inspect and check work which is carried out in accordance with the contract, as well as by requiring the contractor to conduct regular or constant inspections of the sub-contractor. However, research participant MS18 suggested that sometimes it becomes necessary to make an early decision to reject the contractor or the sub-contractor if either one of them demonstrates poor performance and/or workmanship, and to find an alternative service provider before the project gets underway, by which time high quality skills and performance would be needed. These various views are typified by the following comments:

> "There must be continual supervision of the work of the main contractor and sub-contractor by a consultant especially in the initial phase of execution. If this work does not meet the required level … it must be excluded as soon as possible before starting the more complex work which needs more skills". (MS18-10)

> "In terms of supervising and observing the performance of the sub-contractor as well as that of the consultant in overseeing the work of the main contractor, this was very poorly performed. There should be a regular evaluation of the work of the consultant as is the case with the contractor". (JS12-14)

5.3.20 Utilities Service Connection

The research data initially included in Table 5.21 indicated only two data items of conflict (felt and manifest) between the project parties, namely the project owner and the contractor, over utility services. However, two extra data items were added to this number from the Validation Survey. This is particularly significant given the exceptional 'extra cost' and 'delay' that might emerge in the construction phase due to unknown utilities data at the pre-design phase as outlined in section 5.3.6.

Table 5.21: Construction Phase Data: Utilities Service Connection

#	Description of data	Class of data			Validation Data
		Latent	Conflict	PM	
100	Connecting the utilities service to the building /facility was an issue of dispute.	_	2	_	2

36	Early project team co-ordination and liaison with the local authority.	_	_	2	_

This is an example of conflict which can be related to the words ‘omission’ or ‘postponement’. Neither party negotiated this matter or took any early proactive action to liaise with the local authority and utility company providers before the construction phase in order to make utilities services available and connected to the facility in a way which took into consideration the time frames of the construction and project phases. The contractor AH17 alluded to this when he said:

> “Making the utility services available is a common responsibility recognised by all parties, including the client, project manager, contractor and local authority. It should be recognised as a necessary task and included in the project schedule … There was a delay in connecting the utility services, therefore, the entire project duration got delayed. All the key parties in the project should not have left this matter until this phase [construction phase] but were supposed to have had discussions and co-ordinated their actions earlier on. The role of the project owner was not major in this aspect; he, as facility owner, requested the facilitating of the official procedure and the requirements to process the utility request with the approval of the local authority. Although he could have delegated the responsibility for this job to the project’s management team or contractor, this is not the main point, which was the need to pay attention to this matter before this phase took place”. (AH17-16)

Another similar example is shown below outlining clearly the poor attention paid to, or postponement of, addressing the utility services as early as possible on the part of the client’s representative and the project designer, which in consequence caused a conflict between the contractor and the client’s representative over ‘who was going to bear the extra cost’:

> “Neither the project owner nor the designer contacted the relevant local department to process a request for supplying the utility services to the building site. They also did not get the underground utilities drawings from them, nor did the designer include it within the design drawings. Therefore, neither the project owner nor the contractor had any prior knowledge in this matter before construction work started … The absence of these underground utility drawings resulted in the contractor and the project owner not realising some obstacles to connecting these utilities to nearby utility connection points. Thus, this played a part in incurring extra cost and effort that was not

addressed during the tendering phase and which consequently caused conflict between the contractor and the project owner in terms of who would bear this extra cost". (EA20-20)

5.3.21Construction Material

Table 5.22 shows a total of 25 conflict data items obtained from the interviews survey which all central upon construction. As the conflict analysis carried out concern significant numbers of these conflict data are described in terms of conflict severity whether as perceived, felt and manifested conflicts. In addition to these conflict data reported during the interview survey, there are an extra twelve were added to this number from the validation survey.

Of these, the most frequently identified conflicts were classified as data # 51, which concerned newly acquired construction materials and components during the construction phase which were not originally in the bill of quantities document. From the statistical analysis, there was a significant association between this particular type of conflict item and conflict item # 72 in section 5.3.10 which concerned discrepancy or inconsistency between the bill of quantities document and design drawings.

Table 5.22: Construction Phase Data: Construction Material

#	Description of data	Class of data			Validation Data
		Latent	Conflict	PM	
102	Disagreement over what kind of materials specifications should be supplied or used to meet the building design.	_	7	_	4
51	Conflicts due to emerging new requirements of construction materials /components which were not originally in the bill of quantity document.	1	10	_	5
5	An increase in the prices of some construction materials (bill of quantity) during the construction phase was an issue of dispute.	2	5	_	3

The relationship between these two data categories indicates the importance of conducting an effective and careful preparation of the bill of quantity (BOQ) document during the pre-construction phase, assuring its conformance with the drawings to avoid potential conflicts as a result of emerging new requirements for construction materials/components which were not originally in the bill of quantity document but are needed in the construction work. The BOQ, presented as a tender document, which provides the contractor with the cost significant factors and authoritative information, was not ideally suited, either in format or content, to the needs of construction performance requirements. Consequently, conflict was invoked due to 'extent of use' of construction materials, or re-working of these as 'new things' which occurred throughout the construction performance in violation of what had already been stipulated in the contract agreement.

The following is a clear example of this type of conflict, provided by client representative Y9:

> "There was a case we faced during the construction phase that led to disagreement between us [client representative] and the main contractor. The extensive use of new construction material items needed for the performance of construction works was not included in the quantity bills document. The inflexibility of the PWC contract made this problem even more complicated since it stipulates that the contractor should provide all the construction material items [BOQ] needed for construction works but does not stipulate how the contractor can be compensated in case additional items are acquired which were not in the bill of quantity. However, of course, the root cause of this non-conformance was the designer who provided carelessly prepared and faulty documents". (Y9-28)

Similarly, the second element of conflict in the table above is in relation to specific information relating to the material specifications of project # 102. This is centred upon two issues: firstly, whether these materials are actually incorporated into the construction works but not incorporated into the specifications document or vice versa; and secondly, whether the specifications for the materials have been interpreted by the project parties in more than one way. Nevertheless, it should be noted that, no matter how close the specifications document may come to achieving perfection, it is virtually impossible to completely avoid the occurrence of errors, misrepresentations, discrepancies or conflict as stated in section 5.3.10. However, this should not deter writers of specifications for BOQ documents from being meticulous in their preparation and in their attention to detail.

Finally, the third element of conflict relates to price inflation of construction materials during the post-tender phase. As far as the PWC contract is concerned, the cost control system only works as long as the prices of fixed materials are established early in the pre-design process by the project owner and it is understood that these prices may go through several changes later on at the hands of the contractor as part of tender preparation. However, using this system can provoke significant conflict if it operates without taking into account any future price changes of materials. The following is an example which illustrates this type of conflict:

> "Within one day of signing the contract, the price of the building steel was doubled. This 100% increase in the price would certainly cause us [contractor] to make a loss as the quantity of steel alone required for the building foundations amounted to more than 50 tons … The dispute between the project owner and us started from there but in the end, as the contract did not address this point, we made a separate sheet to be attached to the contract containing the difference between the two prices and the project owner agreed to pay in the end as he didn't want the project to be delayed due to this problem". (JS12-21)

5.3.22 Procurement

Since each construction project is 'unique' and is carried out by a set of 'temporary' partners working in a complex, multi-level team (see Chapter One, Section1.3), a single systematic approach to experienced procurement is difficult to obtain. However, the data indicate that the sensitivity of supplied items generated a number of felt and manifest conflicts for clients and contractors alike since they neither met the project needs nor the clients' requirements adequately. This case applies more clearly to some of the purchased electrical/mechanical (E/M) machines where the sub-contractor (namely, PO10) supplied E/M machines without seeking formal approval from the client, who later rejected them (this happened also in another case). The conflict data related to procurement is shown in Table 5.23.

Table 5.23: Construction Phase Data: Procurement

#	Description of data	Class of data			Validation Data
		Latent	Conflict	PM	

46	Some of the electrical/mechanical machines that were purchased or supplied were incompatible with the project requirements or did not fit with the building design.	1	3	-	-
85	Some of the purchased/supplied mechanical machines did not comply with the bill of quantity description.	1	1	-	1
73	The sub-contractor was not fully familiar with some of the technical aspects associated with supply.	1	-	-	1
43	Orders for purchasing or supplying should be approved by the liable person in writing.	1	-	2	-

The conflict is centred upon two issues, the first concerning whether the supplied items (be they machines or materials) have met the project's needs and the client's wants. Here, they did not fit with the building design. A reason for this, as indicated in section 5.3.7 (design team: communication and co-ordination) by some respondents, is that the designer did not communicate sufficiently early with the supplier to collect the necessary data to support the need for the items to be included within the design drawing. The second issue, which more closely involves PO10, is that after processing the purchasing of some expensive items supplied by the sub-contractor and bringing them on site, they were rejected by the project owner as they did not meet the project's needs or the client's wants adequately. This happened twice with PO10. The first time, the sub-contractor recognised his mistake; however, this did not happen in the second case when the project owner changed his mind after verbally approving the processing of the purchase order. The following quotation is a brief illustration from a contractor's point of view of the necessity of processing a purchase order in written form rather than through a verbal order:

> "The sub-contractor has received an oral instruction from the client's representative to supply surgical fracture and he has been referred to some supplier with whom the project owner usually deals. The sub-contractor did the job and started the installation. However, a problem was discovered later with these surgical fractures concerning their specifications. Therefore, they were rejected by the project owner at this stage and the sub-contractor had to pay the price for it. The upshot

is that trust cannot be guaranteed by oral instruction and must always be followed by an official written document". (L10-25)

5.3.23 Change in the Construction Phase

One of the most significant factors leading to conflict in the construction phase emerged as change as is indicated in Table 5.24, and shown in data type C11 and its validation.

Table 5.24: Construction Phase Data: Change in the Construction Phase

#	Description of data	Class of data			Validation Data
		Latent	Conflict	PM	
C11	Change or variation order(s) made by the project owner over the contractor.	2	10	_	8
98	Change or variation order was not recorded in writing.	3	_	2	2
81	The need to settle disagreements by negotiation.	_	_	1	
84	Additional effort was needed by the main contractor to fulfill some construction elements which were missing from the design drawing.	_	2	_	2

The term 'change' is defined in the literature, including that supplied by the Project Management Institute (PMI), as change of scope or design, as mentioned earlier in section 5.3.1 and section 5.3.9 which, significantly, can happen at various stages of the project. However, as the pre-design phase is concerned with the scope of change, when change does occur at that stage it can be processed in a flexible and rapid manner without incurring significant extra cost or 'cost of change', or causing delay by assessing whether it has been processed at or post the pre-construction phase. This relationship is illustrated in Figure 5.7. However, according to the literature (notably Ibbs, 1997; Hsieh et al, 2004), causes of change vary significantly for a number of reasons, some of which have been described in previous sections of this chapter. For this reason, the task of managing change or exerting control has become a key consideration in the quest for alleviation or even prevention of the potentially harmful consequences of project change, especially with regard to clients, who sometimes do not have proper construction experience. A series of practice guides have been published by several institutions such as the Chartered Institute of Building (CIOB) in the UK and the Construction Industry Institute (CII) in the USA, where two dedicated task forces have been established on "Project Change Management" and "Cost/Schedule Controls". Interview N05 expressed the importance of these management skills when he stated:

> "Variations in any project should happen and are inevitable but it is a question of how such occurrences could be reduced or how they could be professionally addressed in order to decrease their harmful impact. It is a matter of ensuring that change is managed efficiently and perfectly" (N05-13b).

Changes can lead to project delay, cost over-run, quality defect and other defective aspects of construction projects. However, a major change would probably lead to project failure, unless the project is large enough to accommodate some or all of these changes. Several research participants interestingly pointed out that changes are a key driver in cost over-runs due to reworking or revision of work. Sun and Meng (2008) confirm this and further state that the cost of reworking in construction projects can be as high as 10–15% of the contract value. The following case from contractor AH17 illustrates this point:

> "[The contractor said] there were some missed revisions of the building design which have not been included in the contract document but the project owner considered them as part of our work framework. They are approximately 15% of the contract value. This has impacted on our profitability. Unfortunately, when we asked the project owner to increase the contract value he refused and this caused a problem between us." (AH17-19)

It is important to note that unless a comprehensive and detailed agreement is made in advance between the key project parties, the negative consequences of change, especially any over-run costs and time delays which may occur at the construction phase, are highly likely to be an issue of dispute. However, typically, agreement over these new changes tends to come later or possibly not at all as the parties may be unable to come to an agreement. Therefore in both situations, it is very important, as indicated by some of the interviewees, for the contractor to have receipts and records of any purchases and harmful impacts related to anything resulting from these changes. The following relevant example given by Respondent D06 indicates this:

> "The contractor did not keep a record of change orders made by the client. Therefore, later on, he could not get approval to make an appeal to get compensation to cover the extra cost which then had to come from his own pocket as a result of this order". (D6-6)

5.3.24 Delay in Project Progress or Handover

Table 5.25 shows several data related in particular to delays in the project either in processing or at the handover point in the construction phase. This issue of conflict can be identified as one of the most significant factors gleaned from the data. There are 27 data items in total followed by eight from the validation survey. However, interestingly, with regard to latent condition of conflict data type, # 53 within this category alone has seven data items of latent condition compared with the other data types. In other words, it probably reflects the significant role of the project owner as being mainly responsible for delaying the construction process compared to the other parties. However, it might be advisable to obtain more accurate and detailed results by performing an empirical survey study similar to that of Assaf and Al-Hejji (2005), which outlined 73 delay factors and ranked the importance of them according to the perceptions or attributions of each of the project participants, namely the owner, consultant, contractor, and labourers.

Table 5.25: Construction Phase Data: Delay in Project Progress or Handover

#	Description of data	Class of data			Validation Data
		Latent	Conflict	PM	
30	The project progression or handover was over schedule (delayed).	3	7	_	5
74	A dispute arose over the project delay due to slowness in site selection and acquisition.	_	2	_	1
68	The contractor received a late submission of the shop drawing.	2	_	_	_
53	The project was delayed due to the slowness of the decision-making process	7	2	_	2

	or bureaucracy of the project owner or client representative.				
64	The project handover was delayed due to the client's hesitation or insistence on following his own interests or requirements.	2	_	_	_
24	Any reason(s) given for delay in the construction process should be in writing.	_	_	2	_
38	Delay in the supplying of some materials led to a delay in the project handover.	1	_	_	_
29	The project was delayed due to a shortage of contractor labour.	1	_	_	_

Therefore, taking into consideration project owner and project manager involvement, contractor and labourer performance, and the contribution of administrative services, it is essential, as respondent D06 points out, that project parties, especially the contractor, should keep formal written records of all reasons for delays to avoid any conflict caused by incorrect attributions of responsibility for project delay. On this topic, he says:

> "If we examine the project delay, it may be attributed to the contractor or project owner or sometimes to the consultant. However, as the delay penalty tends to be applied to the contractor, he should look to his own interests by making sure that during the project any reasons for delay are formally recorded to avoid any possible wrong attribution to his own conduct." (D06-11)

Delays caused by the project owner or project manager due to slow decision-making are probably of more concern to public organisations than private ones as the internal characteristics of public agencies and funding control in general tend to be more bureaucratic. For example, as far as Saudi public project law is concerned, a variation order which will add more than 10% to the project cost cannot unilaterally be approved by the client representative or project manager but should be approved through the Ministry of Finance. This and other causes of lengthening the process, as contractor Ak13 experienced in PO13, are extremely time-consuming and may adversely affect the contractor's on-going performance, resulting in the project schedule 'slipping' over the deadline.

Delays in project completion perhaps represent one of the more common issues discussed in project management studies; the delay data analysis included in Table 5.12, section 5.3.11 shows that some delays start at the design stage, which then have an impact on the bidding and awarding of construction contracts, which in turn impinges on the start of the construction phase. Before the design stage is activated, the authorising entity (board of directors, government commissioner, etc.) will be watching to see if the project can be taken to ultimate completion or to the 'move in' milestone, but this may not be achieved completely free of penalty or dispute during the interim milestones. In all probability, the build-up of delays will inevitably impact on the construction phase and affect the client's desire for on-time completion, but by then this will be nothing more than a false hope.

5.3.25 Payment

The data classified under 'payment' are shown in Table 5.26 .The research data revealed several perceived, felt and manifest conflicts primarily between the client or his representative and the services provider: most commonly with the contractor. The majority of these data concern 'late payment' while the rest concern 'incomplete payment'. A total of 20 conflict data items were collected initially and an additional eight were added to this number from the Validation Survey.

Table 5.26: Construction Phase Data: Payment

#	Description of data	Class of data			Validation Data
		Latent	Conflict	PM	
101	There was a disagreement over the payment of additional compensation to the architect agent/firm.	_	5	_	2
13	There was disagreement over the contractor's claims that he hadn't received some payment by the client.	_	2	_	1
49	There was a dispute when the contractor requested additional payment to cover the over-running of the project cost.	_	2	_	2
103	There was disagreement between the project owner and the contractor over method of payment.	_	1	_	_

97	There was a conflict between the contractor and the other project parties over interim payments.	1	1	1	_
88	There was a conflict as a result of the method of payment not being fully explained in the contract.	4	_	_	1
111	A clearer and more detailed payment mechanism should be specified in the contract.	_	_	2	_
2	Delayed payment for the contractor.	6	2	_	2

It is vital to avoid dispute or disruption during the construction process by ensuring that all service providers' fees, and especially those to be paid to the contractor, are fairly and promptly paid. In fact, this must be done by the receivers of services, particularly the client, in view of the fact that while not necessarily the only project sponsor, the contractor may still be the direct sponsor of the sub-contractor. This practice of payment is used in Saudi Arabian public projects, where the project owner within the PWC contract does not have any direct payment obligation to the sub-contractors but only to the contractor. Therefore, any dispute of consequence between the project owner and the contractor over late payment and/or incomplete payment may ultimately involve one or more of its sub-contractors. Within this context, client representative Y09 stresses the importance of prompt payment and suggests some changes to the PWC to avoid dispute and disruption.

> "The PWC terms do not allow the project owner to make any payments to the contractor or sub-contractor to supply the required equipment and machines for the project unless the machines have been completely installed and are operating. However, this is an inflexible method of payment and can sometimes make the construction process slow down as the contractor probably does not have enough money. The payment must be on time and the PWC contract should be changed to allow the project owner to provide part of the payment to enable the contractor to finance the sub-contractors to supply the electrical and mechanical equipment while the remainder of the payment could be paid later at the commissioning and operation phase". (Y9-17)

As the project becomes larger and more complex, several kinds of financing methods such as public private partnership (PPP), public finance imitative (PFI), design build finance operation (DBF), build-own-operate-transfer (BOOT) and others may become available. Each of these forms of contract is likely to have its own arrangements and regular payment methods. However, the PWC contract does not specify a general method of payment and nor does it have a ‘tailored’, detailed method which corresponds to the actual progress of the project. Indeed, this lack of detail may engender to a large extent ‘different opinions’ which could become a source of dispute, as indicated in data # 88. The contractor EM 16 gives an example of this to illustrate the importance of having clear mechanisms and regular payments in the PWC contract to respond to actual project progress. He states:

> “The contractor asked the project owner for payment at the time of the construction process when it was not due. The project owner refused to do so as he believed the contractor had not earned it yet. It was a source of bitter conflict between them. The PWC contract is supposed to contain a clear payment mechanism and in practical terms the project consultant should do weekly reports, indicating the actual project progress works on-site and measuring the quantity of work including the bill of quantity”. (EM16-6/PM)

5.3.26 Commissioning and Completion Process

This is the period at the end of the construction phase, and within which some conflict data are classified and/or take place as shown in Table 5.27. Noticeably, all these data are sourced only from contractors and consultants who expressed their dissatisfaction or disagreement with the clients’ performance and behaviour during the project commissioning and completion process. In fact, 11 conflict data items were assigned from the interviews and a further three items from the Validation Survey.

This is the final stage of project execution, taking place after the contractor and consultant have performed the final tasks of project construction.

Table 5.27: Commissioning and Completion Phase Data: Commissioning and Completion Process

#	Description of data	Class of data			Validation Data
		Latent	Conflict	PM	
52	Causing a delay or deliberately creating obstacles over taking possession of the building or handover of project by the project owner or client's representative to achieve some personal gain.	4	_	_	1
107	There was a delay by the project owner during the procedure for project acceptance and handover.	_	3	_	1
20	An inexperienced person was involved in the project acceptance and handover process.	3	_	1	1

The main client, client representative or project manager's role at this stage of the project is to check and ensure that the project has been conducted properly from the initial concept at the feasibility and strategy stages. Any structural design difference imposed by the contractor which does not meet with the initial concept established at the project briefing or design drawing will probably provoke a potentially complicated dispute, unless there has been prior formal acceptance by the client. Nevertheless, as the client, with the help of the consultant, is responsible for carrying out the practical completion and completion processes, it is important that there should be a good degree of mutual goodwill in order to conduct the acceptance process, which suggests that they should also have, along with the goodwill, the ability to carry out this task. However, within this context the following examples indicate some minor conflicts caused by lack of goodwill (or good intentions) and experience:

> "Client's bad practice … he deliberately delayed the initial acceptance of the project delivery, trying to make the contractor carry out maintenance for as long as possible". (R1-8/C)

> "I [the contractor] refused a request by a consultant to give him a bribe in return for his goodwill so that there would be no hindrance in the acceptance of the process works. As a result, he impeded and delayed the issuance of the practical completion certificate". (HS23-18)

> "The client representative was incompetent when doing this job. He was 'often offhand' during assessing and reviewing the project completion process". (La15-14)

In addition, with regard to conflict data type # 107, manifest conflict occurred over the client's slowness in finishing the acceptance and completion process which, in particular, went against the contractor's interests. A comment from a contractor illustrates this type of conflict in the following extract:

> "Sometimes a dishonest client representative in a public project or a consultant will refuse or make obstacles towards the approval or acceptance of a project's completion, even if the contractor's performance has been perfect. The aim of such behaviour is to meet some personal interest such as extending the duration of the project to achieve a financial benefit or to force the contractor to pay him an amount of money in order to facilitate the process of approval while 'turning a blind eye' to some faults. Of course this is not always accepted by all contractors and will result in causing a dispute over the delay in the handover process". (JS12-10)

5.3.27 The Client's Non-compliance

The conflict data classified as 'client non-compliance' towards some of the contract provisions are brought under one classification as indicated in Table 5.28.

Table 5.28: General Administration and Regulation Data: The Client's Non-compliance

#	Description of data	Class of data			Validation Data
		Latent	Conflict	PM	
16	A project owner was non-compliant with some of the contractual obligations.	3	1	--	2

Noticeably, all of these data were obtained solely from the design consultants claiming the clients or client representatives were not fulfilling some contractual obligations towards them. Although there are several comments and discussions related to project owner non- compliance elsewhere, they are just as relevant to this section. This data analysis examines the participants' attributions regarding conflict by focusing on two issues. Firstly, there is the client's non-compliance with the contractual scope of the design changes ordered by him. The following comment from respondent FH19 provides an illustration of how this problem escalated to a manifested conflict with the client's representative:

> "During the design development and after the design drawing had been drafted by us [design consultant] the client's representative asked us again to make a major change to the design drawing. On this point, the PWC contract terms stated that the project owner was allowed up to 10% change at this advanced stage. Thus, he was non-compliant by not paying attention to this contractual provision (maximum 10% change) and believing that he could make a change order request free of charge. This caused another serious problem as we did not accept that". (FH19-13a)

The second issue focuses on project owner non-compliance towards an extra compensation payment due to a design change made by him. The following comment from design consultant AD27 illustrates this well:

> "There was a problem caused by the project owner not paying us the compensation [design consultant] for the additional service we provided to cover a late design change requested by him. We wrongly trusted him and our attempts to recover what he owed us were not strong enough during the period of preparing the design". (AD27-06a)

5.3.28 Bid Rigging

Four of the conflict data items obtained from the interviewees referred to bid rigging, and to these a further three such items were forthcoming from the Validation Survey. All of these data emerged during non-case-specific discussion when interviewees highlighted the importance of setting a clearer law aimed at preventing bid rigging practices among some project contracting/sub-contracting firms. This particular practice is a form of collusion or fraud and is entered into at times by bid winners. In practice, as firms become contractual parties (main contractor or sub-contractor firms), they use their position illegally to try to obtain some financial objective forbidden by law and secretly shift their entrusted contractual obligations towards the project to another construction/sub-contracting firm(s), without themselves producing any actual products or services.

Table 5.9: General Administration and Regulation Data Project Transference

#	Description of data	Class of data			Validation Data
		Latent	Conflict	PM	
8	The contractor illegally bid rigging his full or partial contractual obligation to another contractor.	2	_	_	1
71	Sub-contractor illegally bid rigging his full or partial contractual obligation to another contractor.	2	_	_	2
15	A large number of public project bids should not be awarded to a single contracting firm.	_	_	1	_

An indication of the negative consequences engendered by this kind of practice is seen in the following comment made by research respondent M03:

> "It is a real disaster when the contracting bid winner is 'selling bids' [bid rigging] to another contractor or sub-contractor to carry out the work. This illegal practice allows them to generate money without actually doing the work. Sometimes this bid rigging practice would repeatedly happen by creating a sub-contracting chain of three or four main contractors for the same project. However, this practice effectively drains the public purse and allows these projects to be operated ultimately by inexperienced small contractors. This leads to poor quality production and many other complicated problems". (M03-12)

Explaining why the problem of bid rigging occurs, participant M03 pointed out that there is a flaw in the national law relating to the contractors' classification systems, since there are no limits placed upon the number of contracts that any one contractor might be awarded. Clearly, there is an obvious issue of when a contractor's capabilities are exceeded and the law should reflect this, placing limits so as not to allow contractors to win a large number of bids when the volume of work and responsibility is obviously beyond their realistic capabilities.

> "Due to the difficult requirements and faults in the classification system of law, many true and experienced contractors are deprived of being certified to give them the chance of getting public capital project bids. As a result, large certified firms/agents will tend to undertake a larger number of projects which are beyond their realistic capacity. When this happens, they transfer the project by

underhandedly to another contractor of several uncertified contractors … [they] should determine and impose an upper limit on the number of projects that could be undertaken by a single contractor.” (MO3–28)

5.3.29 Classification System

The Saudi national contractors’ classification system is a system of law to be applied to any domestic or foreign contracting firm working or wanting to work within the country. The system is established to classify firms according to their professional skills and financial capabilities, to determine whether or not they should be accepted to participate in public sector projects according to their various sizes and complexities. However, faults in this contractor’s classification system have been attributed as a source of underlying conditions of conflict by some of the research participants. Table 5.30 indicates five conflict data items (data #6) out of eight as identified by the interviewees, and an additional two items obtained from the Validation Survey.

Table 5.30: General Administration and Regulation Data: Classification System

#	Description of data	Class of data			Validation Data
		Latent	Conflict	PM	
6	Faults or weaknesses in the contractor’s classification system and how it is formulated can hinder the selection of an efficient contractor.	5	–	–	2
10	The lack of an effective classification system for design consultancy services agents contributes to unenlightened selection of non-qualified agents.	3	–	–	1

This classification system has been established to help clients and/or project managers recognise which contractor bidders are sufficiently capable/qualified to perform construction tasks of the sizes and complexities required, thus facilitating the selection process. Therefore, it would become necessary for the classification system to reflect the actual construction capability level of each contractor. Otherwise, clients or project managers who are involved in the bidding process may be misled and projects may be assigned to unqualified contractors. However, AbuThnain and Amsugair's (2002) study confirms the existence of faults or weaknesses in applying contractors' classification systems, as the results suggest that such systems do not provide an accurate representation of each contractor's level of capability.

In addition to the data items indicated in Table 5.30, there is one conflict data item and another item from the Validation Survey, which pointed out the lack of an effective national classification system to be applied to design consultants, engineering consulting firms or agents. Similarly, as stated in regard to contractors' classification systems, some research participants emphasise the importance of recognising the design bidders' capabilities/qualifications before they engage with the design work ordered by project clients or project managers: this is to increase the likelihood of appropriate selection being made in accordance with the level of complexity required for the design. This gap in the classification system could lead to dispute(s) since the capabilities required to procure project owner satisfaction may not be engaged. The following comment made by a design consultant illustrates this point further:

> "Some designer agents take on complex projects larger than their professional capability levels and therefore the resultant errors in design consequently lead to errors in execution. As well as contracting agents … as a classification system has not been established and effectively applied, clients will still think that all designers and contracting agents are professionally able to carry out whatever designing work they undertake while their professional capability skills, in reality, may vary in quality". (R01-02)

5.3.30 Dispute Resolution

There are four types of PM strategy data which each describe suggestions made by some of the research participants regarding means of achieving a better dispute resolution procedure to be applied within the Saudi Arabian construction industry in general. Obviously, all of these PM strategy data are specific as they are centred upon how to avoid litigation, as the only dispute resolution tool which it is permitted to apply over dispute cases between government agent (such as the project owner) and private companies, e.g. main contractor, subcontractor, etc,. The ideas suggested by research participants in this matter are indicated in Table 5.31.

Table 5.31: General Administration and Regulation Data: Dispute Resolution

#	Description of data	Class of data			Validation Data
		Latent	Conflict	PM	
27	Avoiding litigation by establishing regulations for other dispute resolution methods such as negotiation, mediation, etc. to be used by disputants.	–	–	6	–
31	Changing the regulations to allow arbitration techniques to be used for public project disputes.	–	–	2	–
33	Establish an Arbitration Centre.	–	–	2	–
37	Arbitration should be applied.	–	–	4	–

The sole recourse to one dispute resolution tool has been stated by law in the PWC standard form of contract (Article 57) to apply to any public project owned by the government, and it states that any dispute settlement must be through the Diwan al Madhalim (litigation system). In addition, it has been stated in the Saudi Arbitration Law (article 3) that in cases where government agents are involved in a dispute with another contracting company, the arbitration method is not to be adopted for settlement. However, a client representative Ab02, made a comment about this particular law, suggesting that it should be changed as follows:

> "Unfortunately, the Saudi Arbitration Law imposes a 'veto' on disputes between contractors and public agents. It says that Arbitration is not permitted to be applied to public project contracts unless it is allowed by the Council of Ministers … make a change to the Arbitration Law by accepting arbitration as a resolution method and including it in the terms of the PWC contract to be adopted in case of dispute. This will ease the burden of litigation and would greatly shorten the time consumed by court procedures as well as cutting costs". (Ab02-10)

In addition, some research participants such as N05, MA08 and others, pointed to arbitration as well as other alternative dispute resolution tools (negotiation, mediation, conciliation, and neutral evaluation, etc) excluding litigation and adjudication as normally to be considered preferred tools compared with costly and time-consuming forays into litigation or adjudication. By making all of these tools available for use, it is likely that the parties can be provided with a much better chance of resolving differences as they arise, before they become disagreements and ultimately disputes. Establishing regulations and dispute resolution centres would be a means of promoting a strategy for improving these dispute resolution options and would probably encourage disputing parties to utilise such options. A client representative, N05, expressed this point in the following comments:

> "As reconciliation, mediation and arbitration are not commonly used in construction disputes to avoid the courts, it is necessary to integrate these ideas into the culture. Lack of legislation to support these useful tools means that they are not widely used. As there are some countries like the US where there are special institutions dedicated to reconciliation, we should have at least an arbitration centre to support this method to make it widespread and applicable to our construction projects [in Saudi Arabia]". (N05-17/19)

5.4 Summary

The results presented in this chapter reveal 30 areas in which conflict in architectural projects in Saudi Arabia occurs. All of these areas are presented whether in terms of various stages of project life or in general administration and regulation, and together, these areas are reflected in the data classification system established by the researcher to categorise the data obtained from the interviews.

Each area of conflict has been presented, supported by the necessary references of other research scholars, and quotations from the research participants in this empirical study. In the following chapter, the next stage of the research – the quantitative aspect concerned with the Validation Questionnaire Survey – is presented.

CHAPTER SIX

Data Validation

6.1 Introduction

This chapter presents information about the Validation Survey which was conducted to test whether the researcher's initial interpretation of the conflict data-types obtained from the interview survey was valid or otherwise, and hence, to learn whether these conflict data were supportive or not. Initially, the chapter provides an explanation of how the validation questionnaire was designed. It then explains how the survey was conducted, and the way in which the data obtained was processed and analysed. It then proceeds to introduce the quantitative results resulting from this exercise and develops an analytical discussion based on these. The chapter ends with a conclusion that summarises the main findings of the Validation Questionnaire Survey.

6.2 Research Validity

Eisner and Peshkin (1990) declared that in qualitative research, the search for validity traditionally involves determining the degree to which a researcher's claims about knowledge correspond to the reality (or research participants' constructions of reality) being studied. The validity is assessed in terms of how well the research tools measure the phenomena under investigation (Punch, 1998). In the case of interviews, it is essential for a researcher to be assured of the validity of the information provided by respondents, as the researcher's purpose is to seek to describe the central themes in the subjects' realities, in addition to understanding the meaning of what the subjects say. However, Johnson (1997) has noted that a potential difficulty in achieving validity in qualitative research is researcher bias, arising out of selective collection and recording of data, or from interpretation based on personal perspectives. Bryman (2001) suggests that to reduce any such bias and facilitate the validation of research participants' contributions, researchers should share their interpretations and theorising with the same research participants, who can check and amend the researcher's interpretations, thereby providing feedback as to whether these are recognisable accounts consistent with their knowledge or experience.

In order to follow this advice, a Validation Questionnaire was constructed for completion by the respondents with the intention to subject all the data gathered in the interviews to a rigorous ratification process.

6.3The Progression of Validation Data

6.3.1 Formulating the Validation Questionnaire

The Validation Questionnaire was formulated as a quantitative instrument. It was designed to check that the data classification system emerging from the qualitative empirical work (interviews) presented a clear and true picture of the points of discussion arising out of the interviews. To this end, quantitative analysis was used, whereby qualitative findings in terms of both conflict-type data and PM strategy-type data were transformed into statements on a questionnaire survey for later statistical analysis. In regard to conflict-type data, the first attempt was made with interview #16 (see Table no 5.1 Chapter Five) where the qualitative descriptions of pure conflict data were integrated into the form of a questionnaire for the Validation Survey. However, this early form of validation can be regarded as a first draft since it did not contain similar conflict data descriptions (themes) as those in upcoming interviews. Concurrently, the process of refining statements continued as more interviews were carried out and more transcripts created. Nevertheless, by interview # 23, the final form of validation had been produced, as no more 'new conflict' data descriptions emerged.

At this point, before the final validation form was sent to the 30 respondents, it was read multiple times to make sure that all data descriptions or statements were intelligible. To this end, minor adjustments were made in order to finalise the statements as shown in Appendix C. Subsequently, the forms were emailed to all respondents after completion of the remaining interviews. Prior to that, telephone calls had been made to every participant to check their email address and to encourage them to complete the questionnaires. Altogether, 22 of the 30 participants did respond by completing and returning the forms, while the remaining eight did not do so, as indicated in Table 6.3 below.

6.4 Validation Survey and Questionnaire Design

The questionnaire was self-administered, and comprised of closed questions. It was designed when the qualitative data collection process (interviews) was still underway, during which time several draft forms of the Validation Survey were. The final form, however, emerged before interview # 23 was conducted. One standard form was emailed to each respondent in each or the three research participant groups, namely project owner/client representatives, design consultants, and contractors. The form was exclusively in Arabic since the majority of the participants were more familiar with the Arabic language and able to respond better in that medium. However, before the final form of the Validation Questionnaire was emailed, it was translated into English, thereby providing two versions of the instrument. Each version was reviewed by experts who spoke both languages, and they checked whether the questions and the covering letter reflected the original meaning of what was stated in Arabic. As a result of this exercise, a number of comments and suggestions for modifications were heeded and some rewording was made.

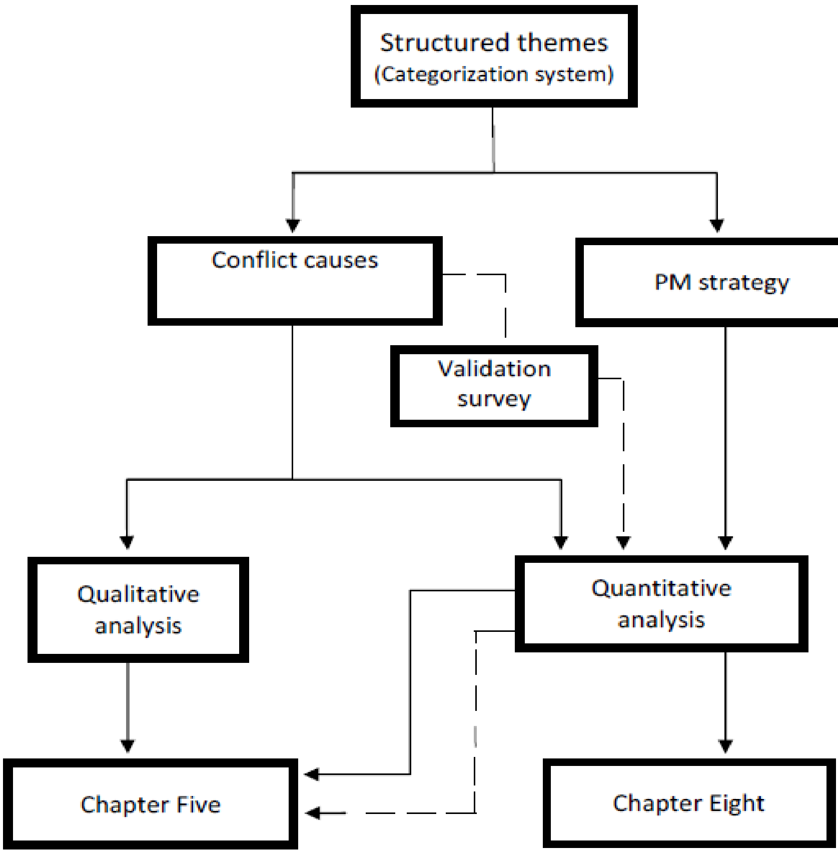


Figure 6.1: A Schematic Representation of the Rest of the Research Process

Having gone through the above-mentioned process, the questionnaire was finalised. It contained a project name and number to be supplied by the researcher before sending the survey. In addition, there were two sections, the first one covering the *level of involvement,* indicating the participant's involvement in the project in question in terms of its life cycle; and the second addressing *conflict analysis,* in which a list of conflict causes only was included in the form of tables in which each descriptive statement formed one row. These tables of conflict causes conformed to a classification system consisting of four groups according to the sequence of progression in a project's life, i.e. the pre-design phase, pre-construction phase, construction phase, and commissioning and completion phase. In addition, as there were general descriptions of conflict causes, there was a fifth group which was named 'general administration and regulation'.

In each table of conflict causes, the survey respondents were asked to circle their answers to two questions. The first one was concerned with the applicability of the statements found in each table to ascertain whether or not these statements or descriptions represented real situations within their case studies. This question was constructed with three possible responses as follows: agree, disagree and N/A or I don't know, and these responses were symbolised as 1, 2 and 3 respectively. The second question, which was concerned with measuring the intensity level of conflict, was classified into five levels, symbolised as 1, 2, 3, 4 and 5, starting from the lowest to the highest level. Definitions of each level were also included in the questionnaire form.

However, the overall questionnaire was rather long and a decision was taken to reduce the statements for the questions by limiting them in scope to conflict-type data descriptions. One of the main reasons for this was to encourage the respondents to complete the form. Data descriptions of the PM strategy were removed and became the subject of another separate questionnaire survey as indicated in Figure 4.3 in Chapter Four to be completed by a wider range of respondents as discussed and indicated in Chapter Eight. Subsequently, with further developments and the incorporation of final comments given by the research supervisor, the Validation Questionnaire was finalised.

6.5 The Validation Survey Data: Analysis and Discussion

The Validation Questionnaire was then emailed to each of the 30 respondents with a request for completion within two weeks. In the event, twenty two (73.3% response rate), were returned with all questions answered, while eight (26.7%) were not acted upon as the researcher either did not receive any email reply from the respondents or was unable to contact them.

In response to the first question in the Validation Survey Questionnaire, all twenty two respondents ticked a large number of descriptions of conflict issues within their projects that were under discussion during the interview survey. However, some of these statements or descriptions had not been pointed out by respondents during their interviews, and had only come to light as further descriptions of conflict issues or causes during the validation survey. Nevertheless, all of the statements or descriptions that were ticked by these respondents in the validation questionnaire survey were collected as data items to attempt to indicate which responses made by them were in agreement or disagreement. The responses agreed were manually represented as 'all responses in agreement' and coded in the Validation Table (see Appendix E) shown in a separate column. Each data item within this Validation Table was given a distinct code. For example, the data item belong to the respondent Fahad was given the code FH19, 'FH' indicating the initial or acronym of the respondent's name (F) associated with interview number of 16 as Mr. Fahad's interview was the 16th one undertaken by the researcher.. In addition legend V was also given to this coding system to indicate that this data item was obtained from validation survey questionnaire and still raw as the data had not been processed at that stage.

A total of 276 data items were obtained from this validation survey. The breakdown of the results appears in Table 6.1 in conformance with the data classification system, in which comparisons were also made with the data obtained during the interview survey. The total amounts of conflict data collected by both survey exercises within each element of the classification system are shown in Figure 6.2.

Table 6.1: Amount of Conflict Data Collected

Data classification	Interview data	Validation data
Pre-design	21	24
Pre-construction	87	84
Construction	135	128

Commission and completion	10	5
General administration and regulation	16	35
Total	269	276

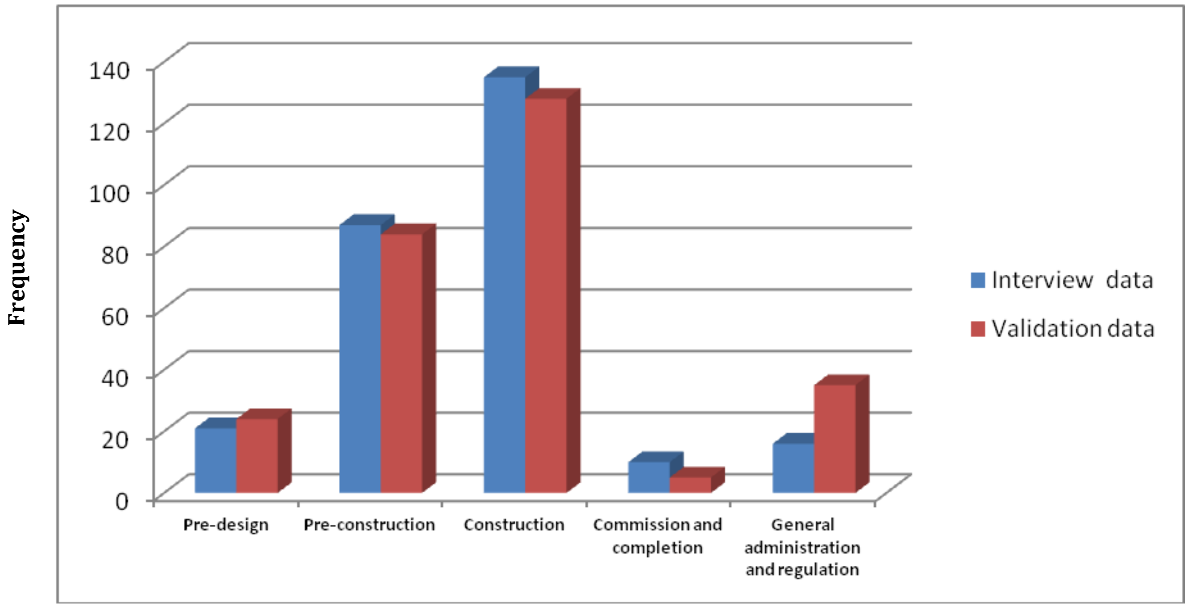


Figure 6.2: Total amount of Conflict Data Collected

The data items were subsequently processed in a comparison of what had been raised as conflict issues during the interview survey and what had been indicated as the same in the validation survey. Only the data items that were in agreement with or showed soeme element of corroboration with those found in the original interviews were processed. These particular data items were manually represented as ‘responses in agreement’ and coded in a separate column in the Validation Table. A respondent code was given to each item associated with legend ‘A’ extracted for the word ‘agreement’.

On the other hand, the data items were not in agreement with, or showed no element of corroboration were manually represented as ‘responses in disagreement’ and coded in in a separate column in the Validation Table. A respondent code was given to each one of these data items associated with the legend D extracted for the word ‘disagreement’.

The results of this comparison are presented in Tables 6.2 and 6.3. The final results showed that 85% of the responses received in the validation survey were in agreement with the original data items obtained from the interview survey. This percentage indicates strong support for the results and, on the whole, suggests that the original research interview and the survey corroborate each other. The tables also present a summary of the breakdown of this final result by way of the data classification system and research respondents.

Table 6.2: Validation of Data Results by Classification System

Data classification	**Responses were in agreement**	**Responses were not in agreement**
Pre-design	14 (100%)	0 (0%)
Pre-construction	40 (80%)	8 (20%)
Construction	63 (85%)	11 (15%)
Commission and completion	3 (75%)	1 (25%)
General administration and regulation	8 (80%)	2 (20%)
Total	128 (85%)	22 (15%)

Table 6.3: Validation of data Results by Research Respondent

Interview code	**Responses were in agreement**	**Responses were not in agreement**
M03	(9) (90%)	(1) (10%)
S04	(5) (83%)	(1) (17%)
N05	(9) (81%)	(2) (19%)
Y09	(11) (100%)	(0) (0%)
L10	(8) (89%)	(1) (11%)
Ak13	(8) (89%)	(1) (11%)
Gd14	(4) (67%)	(2) (33%)
La15	(7) (100%)	(0) (0%)
EM16	(4) (80%)	(1) (20%)
AH17	(6) (85%)	(1) (15%)
MS18	(5) (83%)	(1) (17%)
FH19	(3) (75%)	(1) (25%)
EA20	(7) (87%)	(1) (13%)
ST21	(5) (62%)	(3) (38%)
MG22	(6) (100%)	(0) (0%)
HS23	(7) (78%)	(2) (22%)
AS24	(4) (100%)	(0) (0%)
GH25	(6) (100%)	(0) (0%)
SS26	(8) (89%)	(1) (11%)
AD27	(2) (50%)	(2) (50%)
AF28	(2) (100%)	(0) (0%)
MK29	(2) (67%)	(1) (33%)
Total	(128) (85%)	(22) (15%)

In contrast, there are some validation data items or responses that were not in agreement with the original data, amounting to 15%. Whilst this exposes some weaknesses in the validation exercise, the percentage is acceptable since it is not too high, it can be attributed to several reasons. Firstly, as indicated earlier, eight of the 30 respondents did not participate in the Validation Survey. Secondly, lapses of memory in recalling some details of conflict incidents may have occurred among the research participants, and this is perfectly feasible given the fact that most of the project case studies were discussed one or two years after the post-completion stage. Furthermore, the amount of time which elapsed between processing the data from the interviews and processing the data from the questionnaire survey may have been influential.

A third point concerns certain statements in the questionnaire which were derived from the interview exercise and then classified as ‘latent condition causes’ (see Data Table in Appendix D). These statements represented the respondents’ ‘opinions’ as they were not in themselves issues of conflict but were assumptions made by them. However, the researcher noticed that with some of these opinions were changed at the time of the Validation Survey, and again it is possible that the length of time that elapsed between the original research interview and the survey would also have contributed to this change taking place. Finally, another factor that might have affected the results was the perception among some respondents that the questionnaire was too long. This point was conveyed to the researcher by some of the respondents, and it might well have frustrated the respondents in some way which in turn might have caused them to lose accuracy while answering the questions in an effort to finish as soon as possible.

In the second item in the Validation Survey Questionnaire, the respondents were asked to choose conflict statements or descriptions that they could identify with and to indicate the intensity of the conflict involved, bearing in mind the impact of the conflict on the project. Although, each of the levels of intensity are defined in Chapter Two, they are briefly referred to here again for ease of reading.

1. Latent conflict: an existing underlying source of conflict which may or may not come to the attention of, or sometimes ends up being unnoticed by, the other person or group.
2. Perceived conflict: one or more parties begin to recognise a conflict.
3. Felt conflict: a conflict which becomes personalised.

4. Manifest conflict: a conflict enacted through behaviour by one or more parties.
5. Conflict aftermath: where the conflict is in serious need of genuine resolution.

All of these levels of intensity as pointed out by the respondents in the Validation Questionnaire Survey were collected as data items that were subsequently compared with the levels of conflict described by them in the interview exercise to ascertain whether there was agreement or some degree of corroboration. Coding process has not considered in any of these data items but they were represented all through within the discussion and analysis developed in Chapter 5.Data items that were not in agreement were discarded as the were of no help in the validation process.

6.6 Conclusion

The supportive results of the Validation Survey provide a further indication that the data-type descriptions were formulated appropriately, thereby confirming that the researcher's interpretation of the interview data was valid. The final result was very satisfactory as it represents 85% (128) of the validation data. Moreover, there were valid reasons why the remaining 15% of data items were not in agreement, so overall, it is possible to have a good degree of confidence in the researcher's interpretation of the reality of the respondents' conflict experiences. In the following chapter, the issue of conflict causation is discussed.

CHAPTER SEVEN

Conflict Causation

7.1 Introduction

This chapter unveils and maps out the nature of conflicts in building projects in Saudi Arabia. It presents a summary of all of the identified conflict areas which were presented and discussed in Chapter Five, providing a report in section 7.2 which contains the same five elements as those in Chapter Five. For each element a small table indicates the amount of 'latent condition' and 'conflict' as well as a report of relevant causes of conflict as classified and distributed to this element in Chapter Five. In each of these reports the relationships between various 'latent conditions' and 'conflicts' have been explained and briefly discussed to understand why and how, identified conflicts in the project cases investigated first emerged. In section 7.3, all of the relationships between the two classes of conflict variables (latent conditions and conflict) are presented in a conceptual mode: some of these relationships have already been discussed in Chapter Five as they indicate significant conflict associations. This information is sifted and reassembled to be presented in the same way as section 7.3.

7.2 Summary of Conflict Causes

Pre-design Phase

In the Pre-design phase 21 items were reported as indicated in Table 7.1.

Table 7.1: Distribution of Conflict Types in the Pre-design Phase

Classification system element	Latent	Conflict	Latent and Conflict
Pre-design	21	0	21

From Table 7.1 it can be seen that all the 21 items occurred in the latent phase. Additionally, all of these are classified into the following five groups applicable to the Pre-design phase:

- Project briefing
- Early cost estimation
- Site selection and acquisition
- Site investigation
- Architect selection

It is confirmed by the results presented and discussed throughout this research project that latent conditions of conflict should be identified early in the life of a project (e.g. at the pre-design phase) to avoid or reduce potential conflict which may occur during a later phase (e.g. construction) due to the reverse order interdependency or association relationship between the conflict's occurrence and where the conflict originated from in terms of construction processes.

The results indicate that problems of conflict can possibly be attached to the first decision, which is often the selection by project owners, of an architect. It is important that project owners or their representatives should select a proficient architect to conduct the first project design exercise (the project briefing), for the building they intend to construct. A proficient architect who is able to produce a successful project design, which depends to a large extent upon the success of a good quality project briefing, can truly identify the client's project requirements and objectives. In fact, the empirical work reveals that unclear project requirements and objectives, and ineffective information assembly during the design briefing were latent conditions leading to later conflict over the implications of additional cost and time due to design drawing change requests and 'variation orders' which occurred once the design and construction process was under way. This lack of a good quality project briefing led necessarily to differing project concepts between the project owner, client representative or project manager, and architect at this early stage, and therefore, caused problems once it came to implementation. In the construction phase, the relationship between the project briefing and construction variation orders, reported for six project cases, was more serious, as in all of these cases this triggered different forms of conflicts in this phase. In addition, even if project owners or their representatives do select a proficient architect, it is still necessary to conduct the project briefing in such a way as to avoid such potential problems: furthermore, all parties should also be able to participate effectively during the project briefing exercise. However, in the case of two projects, namely PO02 and PO05, client representatives were described as too inexperienced to properly understand the project requirements and objectives, and therefore certain of these were subject to misconception by the architect.

Furthermore, at this early phase of the project life cyle, when the detailed design documents are still not finalised, latent conditions of conflict originating from the inaccuracy of early cost estimation are also reported. It has been pointed out that project owners or project sponsors issued cost estimation of the projects they intended to build while the detailed design documents remained incomplete. This approach to processing cost estimation was a latent condition of two forms of conflict occurring in the construction phase. It was claimed that due to the lack of detail in design documents, cost estimations did not reflect or were far away from the actual project cost. This early processing of cost estimation which was sometimes used as the basis for estimating the tender price submitted by contractors actually led contractors during the tendering phase to declare tender prices which were less than the real project cost. Hence, those contractors were compelled to cover the additional over-running cost emerging during the construction phase, which formed a subject of conflict.

Furthermore, the remaining latent conditions reported for this element of the classification system were centred upon two aspects of the project site, namely site selection and acquisition, and site investigation.

In connection with the site, it was highlighted that project owners of PWC contracts expect contractors to perform a site or geotechnical investigation and then review the structural design or foundation based upon the geotechnical report before subsequently submitting their tender price. However, since this scenario is not always possible during the tendering stage, when unexpected soil conditions are encountered during excavation work, contractors bear the heavy cost of either major structural design change, foundations, or improvement to the ground to overcome the problem. These areas of conflict, which occurred during the construction phase, was attributable to the latent conflict condition of the soil investigation and the incorrectness of the geotechnical report conducted at the pre-design phase.

Secondly, it has been pointed out that client representatives go through a project bidding and tendering process, and that contractors are appointed to execute the project, without the process of project site selection and acquisition, which should be conducted in the pre-design phase, being complete. Contractors came to this stage having signed the contract to start construction work, and the decision was then made to change the current project site or location to a different one which could meet the requirements and objectives of the project. As a result of this lateness in selecting and gaining ownership of the new project site, contractors were delayed in terms of the project schedule, which ultimately led to conflict over project delay. Another impact of this late change of project site was seen in the further implications for time and cost during the construction phase due to necessary change or variation order relating to a new structural design for building foundations associated with the new site ground conditions, as happened in PO12.

Pre-construction Phase

Ten points were identified within which all causes of conflict reported as applicable to the pre-construction phase may be classified. Table 7.2 indicates the distribution.

Table 7.2: Distribution of Conflict Types in the Pre-construction Phase

Classification system element	Latent	Conflict	Latent and Conflict
Pre-construction	73	14	87

These causes can be divided into two groups, relevant to either the design or tendering phase.

7.2.2.1 Design Phase

- Utilities service
- Design team: communication and co-ordination
- Design faults
- Design change
- Ambiguities and discrepancies
- Design delay

In this element of the classification system, while there are latent conditions of conflict reported within all of these points, two of them, namely ‘design change’ and ‘design delay’ have ‘conflict’ as a data type . This type of conflict data is centred upon two matters: firstly, conflict due to the client’s wishes or perspective being at odds with that of the design consultant in terms of whether or not some aspect of the building design should undergo a major change or reworking at design development or at completion. In this connection, it is the architects' contention that project owners should pay additional fees for any major design change requested by them during the advanced stage of the design development, or at completion. However, the client's perspective was different, since he believed that it was his right to expect such service free of charge: therefore, disagreement between the parties ensued. The architect considered the project owner to be non-compliant with his contractual obligations. In addition, the survey indicates also that design change requests at an advanced stage of a project originates as a result of various issues: ineffective design brief to clarify project objectives and requirements; scope of work overlap between the project owner and the architect in the design contract; and a project owner lacking in experience, all of which have encouraged design changes. The second conflict matter reported was delay in design work progression or completion. Again, this started from the architect's point of view as a result of delay in the design work schedule which was due to the ineffectiveness of the client's liaison with the architect preceding the design work. The client, however, may have held a different belief, and therefore, conflict emerged.

In addition, in this element of the classification system there were problems with documentation. This aspect of the project life cycle represents a project phase during which the three main design documents (design drawings, specifications, and bill of quantity (BOQ)) are developed, and participants pointed out the poor quality in preparing these documents which exposed different forms of faults, ambiguities, discrepancies and lack of information within or between them. However, most of these faults, ambiguities, etc were reported as latent conditions of conflict as they led to the occurrence of conflict between the parties later on, and especially during the construction phase. Among these latent conditions was a concern about utility services information. The conflict problem started when this information was not integrated within these three documents by the architect, meaning that the construction team did not have a full idea of the obstacles and their implications in terms of extra project costs and time (delay) later on at the time of construction work to make utility service points available or connected with the building or the facility. These new project requirements with their unexpected extra project costs/time (delay) were issues of conflict between project parties.

Similar to this, the latent conditions originated from faults, ambiguities and discrepancies within design drawings, specifications and BOQ documents. There were considerable numbers of conflict situations reported at the construction phase in which project parties became involved in sometimes serious conflict as a result of misinformation in one of these documents. Consequently, disagreements about who would cover the unexpected extra costs (e.g. extra construction materials) or about the time implications for the construction process emerged. In addition, the ambiguities and discrepancies in these documents provided another source of conflict, as they sometimes contained two types of specification for the same product or material, and therefore, project parties came to disagreet about which kind of material should be supplied or used.

Lack of co-ordination and communication between the architect and other project team members (e.g. structural engineer, and suppliers) to produce the necessary detail for the design documents is also attributed as a latent condition of conflict, and provoked the occurrence of conflict during the construction process. This is a situation where the architect did not integrate with the other project experts at the design documents preparation stage to allow exchange of information, to review and check design solutions or to gather points of view about what the architect had developed. A clear example of this which was reported throughout the interview survey was a lack of co-ordination and communication between the architect, structural engineer, and supplier. This resulted in faults emerging due to incompatibility between the construction works (e.g. building structural design) and the intention according to design drawings, which in turn caused unexpected problems and led to conflict during the construction process.

Tendering Phase

- Tender cost estimation
- Tendering process
- Selecting a construction team
- Contract provisions

The tendering phase represents a time when the design documents have been completed but when the project phase has not yet begun. There are four points reflecting causes of conflict originating from the project tendering procedure (tendering selection method) and the contracting contract.

As the results reveal, the 'lowest-price wins' selection method adopted in the tendering process was a key point which encouraged several forms of latent condition as well as going further to create conflicts which occurred in the construction phase. This played a role in determining two important aspects of project activities; tender price, and selection of project contractor. The approach is dictated by the Saudi Arabian Tender and Procurement Competition Law, which is applicable only to public projects, and in which public client representatives are requested to select or nominate a tender winner (contractor) based on the lowest price submitted by all the contractors. However, participants in the current research pointed out that this method of tender selection was likely to encourage some of the lowest price contractors to evaluate their tender price with less than desirable care and accuracy, and that therefore, erroneous or unrealistic project cost estimations are submitted and accepted by clients. An additional consequence of adopting this method of tendering selection, as highlighted by the research participants, appears in the selection of incompetent contractors. This is attributed to the fact that in general, tender prices submitted by competent or good contractors are higher than those submitted by the less competent. Therefore, this 'lowest-price wins' selection method or law rules out these competent or good contractors from undertaking a project, while those contractors with less competency in bringing projects to completion become the tender winners.

As a result of these latent conditions of conflict which originated from adopting the 'lowest price wins' tendering selection method, two aspects emerged as matters of conflict during the construction phase: Firstly, there was conflict over additional payments requested of the project owner by the contractors to cover the cost over-run of the project, as the cost estimation made in the tender and accepted by project owners did not meet the actual project expenses. Secondly, disputes arose as project owners became dissatisfied with contractors (tender winners) as their competency to perform was less than the project required.

In addition, the tendering phase represents the stage in which contract documents are developed after the project main contractor is selected. Here, research participants identified several areas related to the Public Work Contract (PWC) where causes of conflict originated from this standard form of contract. These areas can be divided into two particular aspects: poor and lack of contract provisions or conditions, and unbalanced risk allocation.

In terms of the first aspect regarding poor contract provisions or conditions, the research sample highlighted with non-specific case studies, some issues or deficiencies in the form of loopholes, lack of clarity, ambiguities, overlap, etc. within PWC contracts. These issues or deficiencies are reported as latent conditions of conflict, since they create room for contract provisions to be interpreted differently by project parties in a way which may cause tensions between them that in themselves provoke conflict. In fact, from the survey there were two cases of conflict reported between project owners and contractors which could be attributed to ambiguity or overlap within the contract provisions stating the scope of work (limit of responsibilities) for each party within a PWC.

In addition, the interviewees also pointed out that PWC contracts have a lack of contract provisions to address extra time or cost implications associated with changes or variation orders and increases in the price of construction materials which may emerge unexpectedly during the construction phase. Therefore, in such situations, project owners often pass the entire responsibility to the contractors to recover or bear the burden of any extra time or cost emerging. This condition can be attributed to unfair or unbalanced risk allocation within the PWC contract, which is also reported as a latent condition of conflict on other occasions.

Construction Phase

In the construction phase, nine items emerged as causes of conflict. Table 7.3 indicates their distribution.

Table 7.3: Distribution of Conflict Types in the Construction Phase

Classification system element	Latent	Conflict	Latent and Conflict
Construction	54	81	135

The causes are further distributed as:

- Lack of communication and co-ordination
- Unforeseen ground condition
- Performance and workmanship
- Utilities service connection

- Construction material
- Procurement
- Change at construction phase
- Delay in project progress or handover
- Payment

In this element of the classification system, which represents the phase occurring after the completion of contract documents and the main contractor is finally appointed to the project, several latent conditions of conflict and conflicts were reported, as indicated in Table 7.3, which are related to construction phase activities.

As pointed out earlier in section 7.2.1 (Pre-design phase), at some stage in the site excavation works, e.g. when pouring the concrete columns of the building foundations, some contractors recognised unforeseen ground conditions in the building site. Consequently, they realised that change in the structural design of the building foundations or an improvement to ground (soil) conditions should be made to overcome the problem: this consequently implied extra time and/or cost. However, since these new variables (extra cost or time) were not considered within the tender price submitted by the contractors, they were also not addressed as appropriate in the PWC contract; hence, conflicts between project parties emerged. In addition, this type of problem, which was reported five times during the survey, is attributed by the research respondents to problems in soil investigation and the geotechnical report conducted at the pre-design phase, as the original problem which led project parties to an understanding of the site ground conditions which differed from the reality.

Similar to this type of conflict problem are changes required (usually by the project owner) during the construction phase, described as variation orders. These has been reported as a major factor leading to various conflict forms in the construction phase. Essentially, during the construction process, while the contractors were in the process of completing or had completed some of the project's building components, change at the construction phase (variation orders) were received, mostly from clients, requiring them to either conduct some additional construction works or to remove some part of this component of the project which has already been constructed. The conflict in this instance hinges upon the fact that these changes were outside the original scope of work in the contract agreed by both project owners and contractors, which further required contractors at times to work against their interest by carrying out additional work which altered the contract's cost and/or the project completion date. Research respondents citing this type of conflict pointed out various relevant latent conditions, which can be summarised in four points.

The first of these points relates to the design of the building; as mentioned earlier in sections 7.2.1 and 7.2.2.1, any omission, fault, ambiguity etc. in earlier phases (pre-design and design) in the project briefing or design documents led to the incorrect construction of some building components by the contractors, and this subsequently required additional cost/time to rectify the problem. Secondly, a lack of communication and/or co-ordination between the project team members was responsible for insufficient information being shared. This has been reported as a latent condition of conflict which led to some construction materials already delivered by suppliers, and some building works already constructed by contractors, having to be returned/deconstructed at an additional cost in terms of both money and time. Research respondents pointed out that if there were proper communication and co-ordination between project members, i.e. main contractor and client, structural engineer, supplier etc., at a sufficiently early time, some of these problems could be avoided. Thirdly, there were unexpected obstacles or extra work emerging relating particularly to the utilities services of the building. It has been reported that contractors received a number of variation orders to overcome problems related to this and/or to make utilities services available or connected to the building. When contractors attempt to connect utilities services to the building, they may realise that the utilities services require extra time and/or changes to be made in the potential or existing building design or components to make these services available. The fourth latent condition related to this stage concerns change or variation orders made orally rather than in writing. Some of the variation orders incorporated into projects which become part of the contracted scope of work are authorised solely in this manner. However, this method of project management produced latent conditions of conflict as it allowed any project party, in the absence of written evidence or recorded documentation to misunderstand, misinterpret or not even recognised the other party's right resulting from these variation orders.

In addition to conflict problems caused by these changes being outside the original and agreed scope of the contract, there were other conflict problems based upon the new requirements of construction materials/components, particularly as these were outside the original and agreed scope of the bill of quantity (BOQ) document. This type of conflict is one of the most frequent identified in the construction phase. It originates, as pointed out by research respondents, from various latent conditions which can be summarised to two points: firstly, extra or new construction materials required due to new or unexpected construction works or components emerging during the construction phase; and secondly, the discrepancy or inconsistency, which may also be called a lack, fault, ambiguity etc., between the BOQ and the other contract documents (design drawings and specifications). This problem is manifested clearly in PO 22, where a two million Saudi Riyal (SR) building component in the design drawing was to be constructed by the main contractor while in fact it was not accounted for or considered in the BOQ documents. In a similar vein, ten project cases reported conflicts which emerged due to discrepancies or inconsistencies between the BOQ and specification documents. The problems lay in differences in descriptions of the same construction materials between the two documents. This allowed project parties or teams to hold different opinions, understandings, interpretations, etc., which led to conflicts between them over what the nature of the materials to be supplied or used to realise the building design.

In addition, conflicts within this classification system element also arise as a result of issues related to project performance and workmanship. A number of conflicts and latent conditions emerged due to poor performance and sub-standard workmanship undertaken by contractors, sub-contractors and design consultants; errors and defects also occurred in some construction works. The causes of this type of conflict problem can be summarised into two points: first, some of these causes, as pointed out by research participants, originated from the ‘lowest-price wins’ tendering philosophy, since this was believed to lead to the selection of low standard, incompetent contractors, resulting in poor quality performance and sub-standard workmanship, which ultimately caused errors or defects within the building projects. The second point concerns conflicts which arose between project parties due to errors and defects which emerged either during the process of the building construction works or at completion. Such conflicts were existing problems that had not been properly resolved between the project parties, and therefore, were still pending.

An additional conflict type within this classification system element is that of issues related to project procurement. It has been reported that a number of conflicts have emerged due to problems with supply or purchasing of building materials or electrical/mechanical machines, as these were either incompatible with the client’s requirements, or did not fit or comply with the building design or bill of quantity in the contract documents. The key elements of this type of conflict problem, which is sometimes called ‘procurement gone wrong’, are based upon wrongly supplied or purchased building materials or machines and were associated with the extra cost and time related to the need to return them and obtain a refund. In fact, in some cases, as reported by contractors and sub-contractors involved in ‘procurement gone wrong’, the supply company did not allow these building materials or machines to returned, so no refunds were available. Such a case, leading to significant costs, clearly occurred in PO10 when the sub-contractor paid 400 SR for machines that were not accepted when they arrived at the project site. This problem and others like it, originated, as pointed out by research participants, from various latent conditions which can be summarised under two categories: firstly, there were cases where the main contractor or sub-contractor involved in ‘procurement gone wrong’ had failed to check the wishes of key personnel and gain final approval before supplies were obtained. In case PO10, the sub-contractor indicated a further aspect of this type of conflict problem when he stated that he had taken oral assent from the client representative, but that when the building materials were supplied they were then rejected as not meeting the client’s wishes, which created conflict between the parties. The second condition of conflict was attributed to failure to conduct a proper check or to test work done using particular materials or machines prior to supply in terms of whether or not they matched what had been described in the BOQ and building design requirements.

A further conflict problem within this classification system element, one of most common conflict types pointed out by research respondents, is related to project delay in construction progress and handover. During the survey, eleven causes of conflict were reported, all of which prompted actual conflict between the project parties over delay in the construction process or completion. There are also further causes classified as latent conditions of conflict which provoked some of these delays in construction. The results indicate that these latent conditions of conflict comprise issues, procedures, processes, etc. attributed both to contractors and the other project parties, and in particular clients, who clearly participated in the occurrence of such project delays, whether during the construction process or at completion. One case was reported in project PO17, where the main contractor accepted the challenge and guaranteed that project would be completed within the timeframe set in the agreement. However, the research participant reported that this could not be achieved due to a shortage of labour on the part of the contractor. Further latent conditions were reported against the contractors in projects PO24 and PO17, in which cases there were delays in the supply of some materials, and in project P020 by the late submission of a shop drawing, all of which conditions precipitated delays at the time of the project handover.

Latent conditions have also been attributed to project owners, as they forced contractors to extend the schedule for project completion, due to various reasons which can be summarised in three points: first, as pointed out in section 7.2.1 (pre-design phase), some project owners were late or very slow in selecting and gaining ownership of a proper project site, which meant that contractors were still waiting to begin after the official construction commencement date had passed. Secondly, some project owners interrupted the construction process and made contractors wait due to a bureaucratic approach or slowness in conducting the decision-making process, procedure etc., for example in approving variation order requests. Thirdly, some project owners or client representatives who were involved in inspection and testing works took far more time than was allotted to conduct the final checking and acceptance process.

A further issue is that of conflicts and latent conditions related to payment issues, which were reported in the design and construction phases. In the design phase, this type of conflict problem was concerned with designers' requests for project owners to pay them further or additional fees or compensation to cover the additional work done by them. From the client's perspective, this additional work was a part of the designer's responsibilities and, therefore, not to be associated with any additional cost, and some project owners were therefore non-compliant with their contractual obligations. As highlighted by research participants, this type of conflict originates from a common problem attributed to the project briefing, as at the initial design stages, these project owners were not clear about their project requirements and objectives. Therefore, during the design process, some project owners changed their minds and requested changes (adding, modifying or deleting elements etc), and some such changes were radical, leading the designers to believe they were entitled to additional fees for this extra service.

In the construction phase, this type of conflict problem is concerned with various payment issues, which can be summarised into three points: the first, as already pointed out in section 7.2.2.2 (tendering phase), is about conflicts over additional payment requested by contractors to rectify or cover the incorrect cost estimate accepted by project owners as the project cost, which originated from either early cost estimation at the pre-design phase or from tender price. The contractors' attitude here was that these estimations did not meet the actual project expenses and, therefore, these extra expenses should be paid for. The second point is related to conflict as a result of the payment method. Research participants discussed the mechanism of payment used in PWC contracts to pay contractors, arguing that the method of payment set out in such contracts is not fully detailed, and hence, differences of opinion have been emerged between project parties concerning this. An example is the latent condition of conflict reported over the method of payment in project PO16. This originated from an inconsistency in the descriptions found in the BOQ and the specifications documents about measurement units for the same item of material. The two different descriptions led project parties to different opinions over which of the two measurement units described, namely per square or cubic metre, should be adopted as a basis for calculating the amount to be paid for this item. The third point concerns conflict over payment delay from project owners to contractors. Participants emphasise that payment mechanisms or transactions in the PWC contract may be subject to lengthy bureaucracy and take longer than expected to be authorised and completed. This led contractors in some cases to suffer from financial problems, thereby disturbing the progress of their projects. However, some interviewees, as reported in projects PO16 PO24, attributed these conflict problems to the contractors' lack of capital or poor cash flow. They also specifically attributed the difficulty to inflexibility in the PWC contract regarding an interim payment to be made in advance to the main contractor as part of the project budget to enable the contractors themselves or their sub-contractor(s) to cover the cost of the project's requirements (i.e. machines, equipment, etc.) during the construction process, without any possible project interruption.

Commissioning and Completion Phase

In the commissioning and completion Phase, 10 examples of conflict were found, distributed as shown in Table 7.4.

Table 7.4: Distribution of Conflict Types in the Commissioning and Completion Phase

Classification system element	Latent	Conflict	Latent and Conflict
Commissioning and completion phase	7	3	10

However, only one cause was reported, this being:

- Commissioning and completion process

This element of the classification system represents a phase where the construction works are completed and the project handover is complete. As seen in Table 7.4, there are three conflicts and seven latent conditions of conflict reported for this phase. The causes of conflict identified by research participants exclusively highlight the client's performance and behaviour during the project commissioning and completion process, which encouraged several conflicts during this project phase. These sources of conflict can be summarised into two points: firstly, there is the delay while project owners conduct the commissioning and completion process to precede their acceptance of the project, and the actual handover. In this respect, the four latent conditions of conflict reported suggest that some client representatives were deliberately creating obstacles before finally taking possession of the project in order to achieve personal gain. Indeed, from the contractors' perspective in PO1, PO12 and PO23, the purpose behind the project owners' behaviour was to gain financial advantage by searching for some reason to claim that contractors had not constructed their buildings perfectly. Clearly, conflict emerged as the contractors involved did not agree. In projects PO1, PO12 and PO23, the client's behaviour is reported as a latent condition of conflict. In PO12 conflict was provoked over a delay in processing by the project owner when conducting project acceptance and handover, which was also a matter of conflict in projects PO7 and PO15.

The second point is related to lack of experience of the client representatives involved in the project acceptance and handover process. This same conflict problem was reported in three cases as a latent condition of conflict. Research participants stated that as a result of such inexperience, these client representatives behaved unprofessionally and made unfair remarks or followed unfair assessment procedures for the building or the facility constructed. In respect of PO15, a research participant stated that the project owner involved in the acceptance and handover process was not sufficiently familiar with the project contract documents, and was, therefore, 'offhand' in conducting the project completion process.

General Administration and Regulation

In total, 16 items appeared relating to general administration and regulation, distributed as shown in Table 7.5.

Table 7.5: Distribution of Conflict Types in General Administration and Regulation

Classification system element	Latent	Conflict	Latent and Conflict
General administration and regulation	15	1	16

There are three points classified as reflecting all causes of conflict reported as applicable to general administration and regulation, these being:

- The client's non-compliance
- Bid-rigging
- Classification system

In this element of the classification system element, representing general administration and regulation issues (i.e. management, process, procedure, local or national law, regulations, etc.), there are, as indicated in Table 7.5, one conflict and 15 latent conditions of conflict reported, coming together to form three causes of conflict: the first cause of conflict arises solely from the architect's viewpoint, that being the claim that project owners did not fulfil some contractual obligations towards the architect. The interviewees' assertions in this matter of conflict are attributed to two issues, the first of which concerns the client's attitude towards the scope of the design changes ordered.

For example, in both projects PO14 and PO19 the architects considered that the change requests made by the project owners were major rather than minor and were consequently outside of their contractual obligation, whereas the clients had a different opinion. In project PO14 this was a matter of conflict between the two parties. Meanwhile, in project PO19, this was reported as a latent condition of conflict as no disagreement was caused at the time of the change request, but it did provoke conflict later, when the project owner did not approve his change request in writing to the architect. The second issue is the client's non-compliance with the request for compensation by the architect in respect of a design change required by that client. As reported in section 7.2.2.1 (design phase), some project owners refused to pay additional fees to the architect above those which had been agreed, despite requesting major design changes at an advanced stage of the design development or completion. This conflict problem, which was reported in PO26 and PO27, was considered by the architects as non-compliance of the project owners with their contractual obligations.

The second cause of conflict reported in this classification system element is related to bid-rigging. In their general discussion, interviewees highlighted a form of fraud which results in several types of serious conflict, and damage to the progress and quality of a project. This fraud is manifested in the practice of certain contractors and/or other parties present in the bidding process, whereby a government construction contract (government bid) is secretly promised by them to another contractor or sub-contractor, who ostensibly does not meet the criteria for bidding on his own behalf. This rigging practice is continually in evidence by some government contract winners, who conduct further illegal practice to obtain financial objectives forbidden by law. Essentially, they secretly shift their contractual obligations to another contractor or sub-contractor, doing so in such a way as to give the appearance that they themselves are fulfilling the contract when in fact this is 'sold' to an inferior organisation. Indeed, the problem of quality is heightened in the case where the practice occurs repeatedly on one project, and a sub-contracting chain of three or four contractors or sub-contractors is involved. This situation has been reported as a latent condition of conflict which provokes several forms of conflict over poor quality performance and many other complex issues.

The third cause of conflict reported in this classification system element is related to both the national contractors' classification system as well as the design consultancy services agents' classification system. Participants discussed some issues related to these two systems which are reported as latent conditions of conflict. Regarding the contractor's classification system, which is designed to classify local contractors into various ranks in accordance with their construction capability, these issues were centred upon faults, weaknesses and the way this system is formulated. Participants considered that this classification system as it currently stands and is and implemented, does not reflect the actual construction capability level of local contractors, and this can precipitate a situation where project owners do not properly recognise the construction performance capabilities of contractors they are considering, which in turn could impact upon the main contractor selection as project owners are prevented from considering the differences between the contractors' capability to cope with the varying size and complexity of different construction projects.

Similarly, research participants also referred to the failure to establish an effective classification system for design consultant services agents, which sometimes results in unenlightened project owners not selecting a qualified project designer or architect. Participants suggested that this may result for instance in complicated design work being performed by a design consultant agent with less professional capability than required, which may then result in errors and faults within project design documents and in construction processes or works, all of which become the source of conflict.

7.3 Conflict Association

From this summary, it is possible to construct a conceptual model as shown in Figure 7.5, that captures the inherent features of the conflict dynamics associated with construction projects. Clearly, the model is derived entirely from the interviewees' participation, being based on what they have identified. It provides insights into the inter-dependent variables found only between the occurrences of conflicts and the perceived underlying latent conditions. The variables connected with the starting point of the arrows were deemed as latent conditions, whilst variables pinpointed by the arrows and denoted in the boxes were deemed as direct conflict issues which resulted as the repercussions of these latent conditions. For example, the variable, 'lack of co-ordination and communication', led to conflicts over 'type of materials specifications' (data # 102) and 'emerging new requirement of construction materials'(data # 51).

By conducting the Fisher-Freeman-Halton exact test, it is possible to see certain conflict association links between two variables which are described has having significant association. These have been discussed in various sections of Chapter Five and are also presented here in the form of a summary. For more details of descriptions of conflict association between variables, the reader should refer to the relevant sections in Chapter Five, which are indicated at the end of each description below.

1. Conflict due to delay of project commencement or progress during the construction phase was associated with the latent condition of conflict attributable to lateness in selecting and gaining ownership of a proper project site in the pre-design phase (see sections 5.3.3 and 5.3.24).

2. Conflict due to unexpected ground conditions or foundation problems during the construction phase was associated with the latent condition of conflict attributable to problems arising from the soil investigation and geotechnical report conducted in the pre-design phase (See sections 5.3.4 and 5.3.18).

3. Conflict resulting from the demand for the project owner to pay additional compensation to the architect agent/firm was associated with the latent condition of conflict attributable to design change(s) ordered by the project owner in the design development phase (see sections 5.3.9 and 5.3.25).

4. Conflict due to the kind of materials specifications to be supplied or used in the construction phase to meet the building design was associated with the latent condition of conflict attributable to discrepancies or inconsistencies between the bill of quantities document and design drawings which were created during the pre-construction phase (see sections 5.3.10 and 5.3.21).

5. Conflict due to emerging new requirements of construction materials/components during the construction phase which were not originally in the bill of quantity document was a second type of conflict caused by discrepancies or inconsistencies between the bill of quantities document and design drawings (see sections 5.3.10 and 5.3.21).

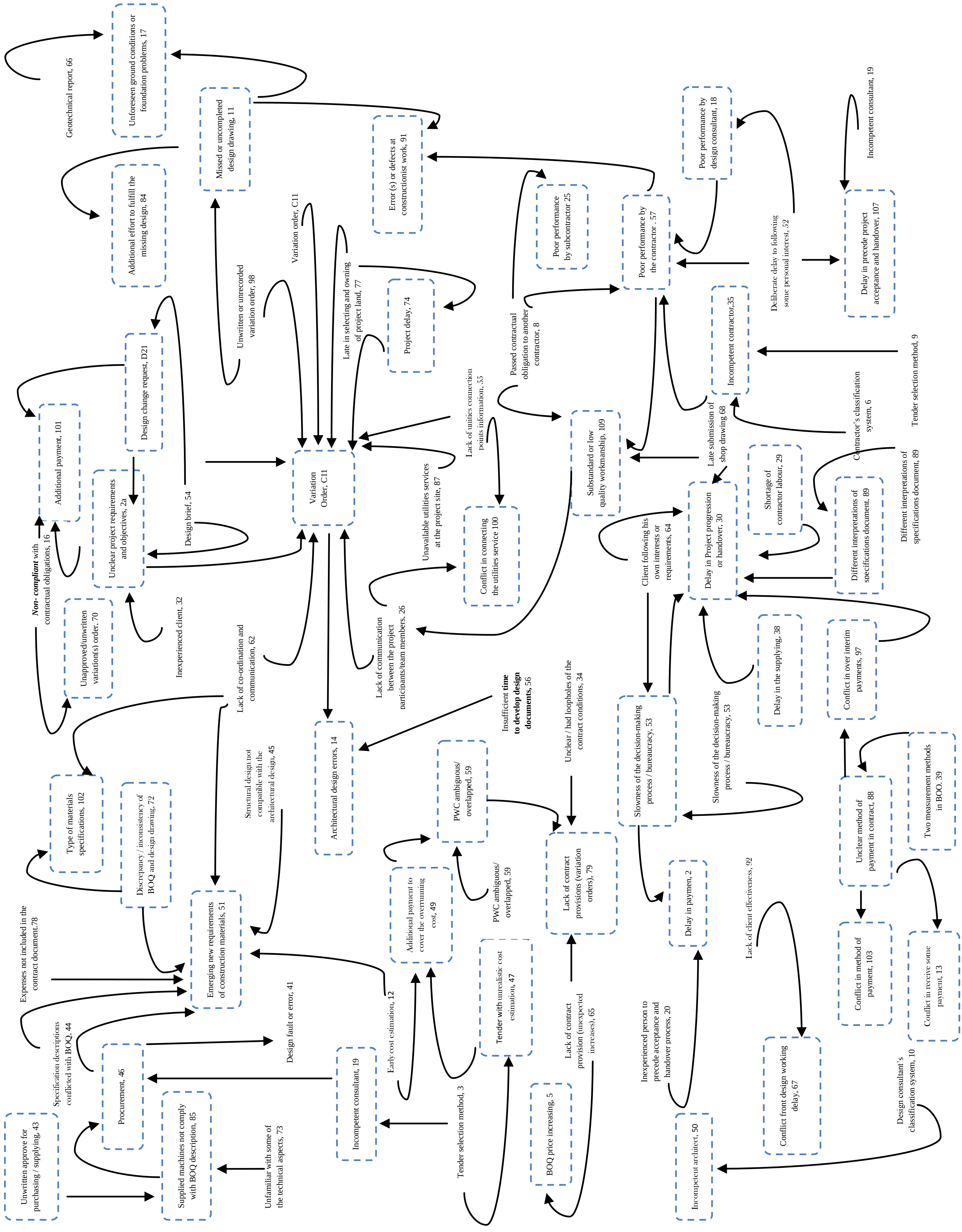


Figure 7.5: Conceptual Model of the Conflict Causes Associations

7.4 Conclusion

Is has been confirmed throughout this chapter and Chapter Five that the determination of the latent conditions of conflict is a key element required to achieve proper understanding and explanation of why and how conflict between project parties occurs. The qualitative method of conflict analysis conducted via the mechanism of semi-structured interviews, was useful in determining many conflict relationships between latent conditions and the reason for conflict, as declared by the research participants. Understanding and drawing up the relationships between these conflict variables, as shown in Figure 7.5, will provide project managers and other interested parties with insight into the inter-dependencies and behaviours of the conflict variables, which can be used as a learning process that may lead to improvements in the future. Further qualitative research with key project participants (project owners, design consultants, main contractors, and sub-contractors) could be undertaken to develop a richer or saturation-point conceptual model which may ultimately provide a more comprehensive perspective of the dynamics of conflict within the Saudi Arabian building projects industry.

CHAPTER EIGHT

Recommendation Test for Construction Projects

8.1 Introduction

This chapter is considered as a complementary part of Chapter Five. It contains only a descriptive presentation of the PM strategy data described within a number of data tables presented throughout Chapter Five, along with the conflict data. It indicates how these PM strategy data have been processed and further tested such that they finally emerge in the form of project management recommendations. These recommendations are provided as a matching discussion to some of the conflict data discussed and analysed in Chapter Five. Additionally, explanations are provided in sections 8.2 and 8.4 to show how these PM strategy data have been processed and finally produced as suggested strategies of project management. However, within these sections, the reader refers to the relevant sections in Chapters Four and Six for more details and explanation. As a result of these processes, the general characteristics of the PM strategy data or recommendations in accordance with the five elements of the data classification system are presented in section 8.3.

The final descriptions for all the recommendations are produced in section 8.6. The chapter provides all the details concerned about the Recommendation Test Survey which was undertaken to test all of these recommendations. These details include the questionnaire development, questionnaire distribution, response rate, and discussion of results, and are provided between section 8.7.1 and section 8.7.4. Finally, a conclusion is offered (section 8.8).

8.2 The Progression of the PM Strategy Data

The same the methodology used for the conflict data was also used for the PM strategy data. Hence, the data was subjected to several processes which ultimately resulted in the emergence of a number of PM strategy data themes (see Figure 4.3 in Chapter Four). Likewise, all of the data collected were classified and distributed in accordance with the five elements of the data classification system. They are all displayed in tables throughout Chapter Five. However, for more information about the way in which the interview data analysis progressed, the reader is referred to the sub-sections of the data progression steps explained in section 4.7 in Chapter Four.

8.3 Characteristics of the PM Strategy Data

As a result of the data processing and classification in accordance with the data classification system, the general characteristics of PM strategy data emerged as indicated in Figure 8.1.

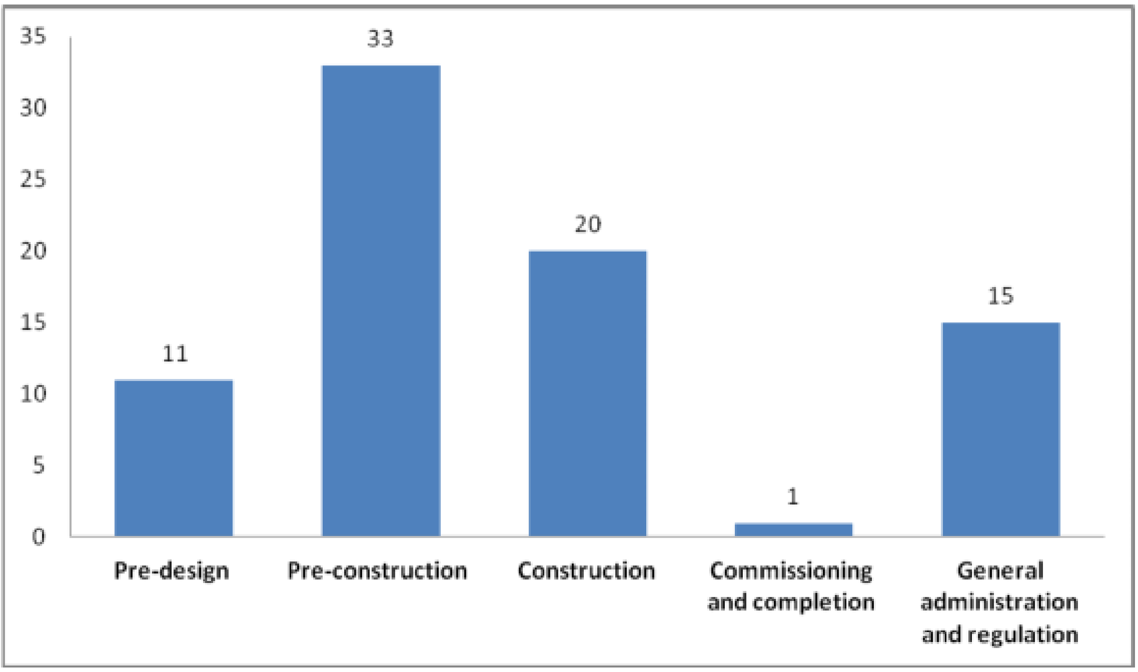


Figure 8.1: The Amount of PM Strategy Data Collected From the Interview Survey.

Notably, compared with the other types of data, this type of data represents the lowest amount accounting for 23% of the total data collected from the interview survey (see Figure 5.1, Chapter Five). Nevertheless, as part of this percentage, the data classified under *Pre-construction* was the largest amount, with 33 data items. The second classification element was for *Construction* which received 20 data items. On the other hand, data classified under *Commissioning and completion* attracted the lowest interest, with only one data item being collected. Meanwhile, the other classification elements, namely *Pre-design* and *General Administration and Regulation* accounted for 11 and 15 data items respectively.

8.4 Data Processing: PM Strategy Data

A total of 80 PM strategy data items were derived from the interviews, all of which were subjected to the same processes as the conflict data. At the end of the procedure, all the similar PM strategy data were integrated and then combined to finally produce project management suggestions that fell into 43 themes.

All the suggestions made reflect new ideas, issues, procedures, processes, law etc, in terms of project management strategies that if implemented, could prevent or at least reduce the causes of conflict which were identified in the interview exercise, and all of them are displayed in tables throughout Chapter Five as well as in the Appendix D (Data Table) They have all been assigned as PM data and all of them classified and distributed to the data tables in accordance with the classification system elements described in section 4.7.4.1 Chapter Four. This classification system was used for sorting each suggestions or set of suggestions in a way to be in consonant with their appropriate place in each classification element. For more description about how the PM strategy themes were distributed and classified, the reader is referred to the qualitative analysis processes stated in sections 4.7.1 to 4.7.4.6 in Chapter Four.

8.5 Developing the Questionnaire Survey: PM Strategy Data

After the 43 suggestions (themes) had been identified, the researcher conducted a quantitative survey and statistical resting of the results in order to seek further empirical support for the research findings. For that purpose a questionnaire survey considering 31 of the 43 suggestions presented in statement form was developed. The other twelve suggestions made by the interviewees were general in nature and if presented as statements, the responses would not reflect any clear idea, issue, procedure, process, law etc that could subsequently be used as the basis for a recommendation in project management practice. Hence, they were discarded. An example of this is the suggestion made by research participant EM16 in response to the latent condition of conflict originating from "… a discrepancy or inconsistency between bill of quantities document and design drawings" (see data # 72 in Data Table, Appendix D). He suggested that "'a discrepancy should not be available between the bill of quantities document and design drawings'" which again does not produce a practical project management idea, issue, procedure or process, for implementation, and therefore, this item was excluded from the questionnaire survey.

The first draft of the questionnaire survey form was subjected to several reviewing processes conducted with the help of the researcher's supervisor. As this process of review progressed, the final Recommendations Test Survey form emerged (see Appendix G).

All of the 31 recommendations comprise a self-administered questionnaire survey with 31 closed questions. Descriptions of each one are provided in section 8.6 below in accordance with the data classification system. At the end of each description, the reader is directed to the appropriate sections and questions of Chapter Five as well as to the Recommendations Test Survey for further information. The descriptions of these recommendations now follow:

8.6. Recommendations

Pre-design Phase

Recom 1: Clients who lack experience should involve professional client advisors/repre- sentatives during the design briefing preparation to help them to set up and transfer their needs, objectives and requirements to the architect (section 5.3.1, Q3).

Recom 2: Clients and professionals should not pay scant attention to the project design briefing process but, should rather conduct an extensive project briefing to establish adequate information about the project aims, objectives and requirements (section 5.3.1, Q4).

Recom 3: There should be no estimation of cost at the pre-design phase of a project. Cost determination should not occur until the preliminary design is finished since at this stage of the design a more accurate estimation can be made (section 5.3.2, Q5).

Recom 4: The project client should not delay project site selection and acquisition but rather should ensure that the selected site meets the project's objectives and requirements before the bidding stage takes place (section 5.3.3, Q6).

Recom 5: Contractually, client and contractor should not only rely upon the geotechnical report to reveal any unforeseen sub-surface site conditions but should also include clear detailed contract provisions that indicate in advance how to address risk allocation and the cost associated in case different soil conditions emerge during the construction phase (section 5.3.4, Q7).

Recom 6: When selecting a tender from a service provider, whether it be an architect or contractor or sub-contractor, and especially for large complex projects, the selection process should be based on the Qualifications Based Selection (QBS) method where tendered selections are founded on competency rather than on the competitive method where tender selection is based on the 'lowest price wins' (section 5.3.5, Q8).

Pre-construction Phase

Recom 7: Design and contract documents should include information regarding how utilities services can be connected. All the requirements and the extra cost associated with making utilities services available or connected should be clearly stated in these documents (section 5.3.6, Q9).

Recom 8: At the design development phase, regular meetings should be conducted between and within design teams and different project discipline experts such as the project manager, structural engineer, mechanical engineer, etc. to check the design solutions in advance before the construction phase starts (section 5.3.7, Q10).

Recom 9: There should be an early liaison between the architect and suppliers/manufacturers to check architectural design solutions for materials/machines to be installed before the construction phase starts (section 5.3.7, Q11).

Recom 10: As clients sometimes make design change orders over architects at an advanced stage of design development or completion, the design contracts should clearly address the permitted scope of design change and the potentially extra service fees incurred should the changes stray beyond the permitted scope (section 5.3.9**,** Q12).

Recom 11: It is inevitable that ambiguities and/or discrepancies in and between design drawings, specifications, and bills of quantity, will emerge, and these will provoke conflict. Therefore, there should be common construction law to address any unsolved problems associated with such discrepancies (section 5.3.10**,** Q13).

Recom 12: The architect should be given a realistic and adequate time to develop proper design drawings/documents (section 5.3.11, Q14).

Recom 13: During the tendering process, the client or project manager should perform a prequalification evaluation of the candidate contractors' tenders rather than simply making the selection based on the lowest submitted tender price (section 5.3.14, Q15).

Recom 14: Sub-contractors bidding for involvement in projects should be evaluated, selected, and then approved before the construction phase starts (section 5.3.14, Q16).

Recom 15: As some contracts have been criticised for their deficiencies such as the Public Work Contract (PWC), note should be taken of the advantages of various professional international standards for the regulation of contracts (Section 5.3.15, Q17).

Construction Phase

Recom 16: In keeping with the traditional approach where the design phase and construction phase are separated, the design team members should communicate with the construction site team members by attending regular meetings with them during the course of the construction process (section 5.3.16, Q18).

Recom 17: Contract management principles should be deployed as a key management tool, especially in large projects, by employing a specialist with relevant experience (section 5.3.17, Q19).

Recom 18: During the construction period, the client or project manager should, at the earliest opportunity, come to a decision regarding the possible exclusion of the contractor or the sub-contractor as soon as signs of a poor level of performance and workmanship become apparent (section 5.3.19, Q20).

Recom 19: The client or project manager should regularly evaluate the performance of the consultant as usually it is only the contractor who is evaluated (section 5.3.19, Q21).

Recom 20: The contractor should be contractually committed to forming a quality control team within his overall team, especially for large projects (section 5.3.19, Q22).

Recom 21: Before the construction phase starts, project team members should effect an early liaison with the local authority and utility company providers to ensure that the implementation of utility services is not delayed, and therefore is unable to adversely affect the construction phase schedule (section 5.3.20, Q23).

Recom 22: Any verbal purchase or supply order made by one project party on behalf of the other is not valid and should be written though a submittal letter (Section 6.3.22, Q24).

Recom 23: Any project party, especially contractors, should keep receipts and records for anything non-contractually agreed, e.g. extra costs arising out of additional time spent on change or variation orders (section 5.3.23, Q25).

Recom 24: Negotiation should be the preferred option for settling any disagreement or dispute (section 5.3.23, Q26).

Recom 25: Project parties, especially contractors, should keep a record of any reasons for delay (section 5.3.24, Q27).

Recom 26: As far as the method of payment is concerned, there should the facility to allow an interim payment to be made to the contractor to enable him or his sub-contractors to supply project machine equipment during the construction process (section 5.3.25, Q28).

Recom 27: The method of payment or format included in any contractual document, including Public Work Contracts, should be specific and detailed (section 5.3.25, Q29).

Commissioning and Completion Phase

Recom 28: The commissioning and completion process of project delivery should be conducted fairly by an experienced person (section 5.3.28, Q31).

General Administration and Regulation

Recom 29: Large numbers of public project tenders should not be awarded to limited numbers of contracting firms (section 5.3.28, Q31)

Recom 30: The Saudi law for public projects should be changed to allow the adoption of arbitration as a method of dispute settlement between government/public agents and their opposing parties as an alternative to going to litigation (section 5.3.30, Q32).

Recom 31: Regulatory legislation and institutions such as an arbitration centre should be established to support arbitration with the other alternative dispute resolution tools such as negotiation, mediation and conciliation as resolution techniques (section 5.3.30, Q33).

8.7 Recommendations Test Survey

8.7.1 Questionnaire Distribution

The Recommendations Test Survey was conducted with a sample of respondents in the Saudi Arabian construction industry. A total of 672 questionnaires were distributed via a three-way distribution strategy, namely, by email, by fax, and by hand. Altogether, 46.1% of these questionnaires were returned. Brief details of the distribution and collection of the questionnaires, as well as the responses, omissions and non-returns are shown in Table 8.1.

Table 8.1: Distribution of Recommendations Test Survey

Method of questionnaire forms delivery	Sent	Replied or Collected	Skipped or Unreturned
By email	391 (58%)	219	172
By fax	120 (18%)	28	92
By hand	161 (24%)	63	98
Total	672 (100%)	310 (46.1%)	362(53.9%)

8.7.2 Response Rate

The questionnaire was designed to obtain feedback from four types of company representatives, these being: client or client representatives, architects/consultant service providers, main contractors, sub-contractor and others e.g. quantity surveyors, arbitrators, etc. Table 8.2 shows the response rates according to each of these categories, from the 310 responses returned.

Table 8.2: Response Rate by Respondent Type

Type of questionnaire respondents	**Response Percentage**	**Response Count**
Client or client representative	25%	77
Design consultant or architect	30%	93
Main contractor	35%	109

Sub-contractor	5%	16
Other	5%	15

Figure 8.2 shows that responses were dominated by professionals working in the building construction industry. Approximately 70% of them had experience of more than five years. In fact, close to half of the respondents (49%) had a good knowledge of the industry with over ten years of experience. For this reason, the quality of results obtained is believed to be high.

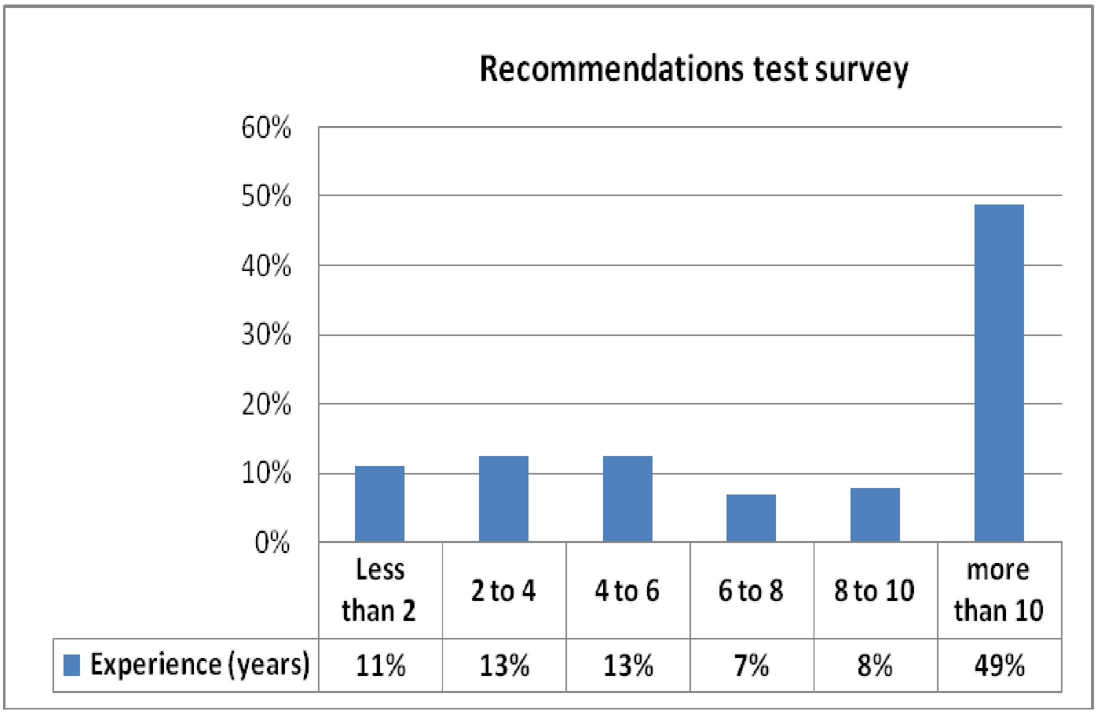


Figure 8.2: Response Rate by Respondents' Years of Experience

Each respondent was provided with an online or paper copy of the Recommendation Test Survey. All of the first 33 questions in the questionnaire were to be answered with the exception of the last question (Q34) where an option box was drawn for any comments to be made by the respondent. The questions asked were designed for the respondents to react to by selecting one of four levels of agreement, namely 'Strongly agree', 'Agree', 'Disagree' and 'Strongly disagree'.

8.7.3 Survey Results

In order to establish the overall attitude of the research respondents toward the set of recommendations, the researcher first used the Weighted Mean test, which was conducted by using a four-point Likert scale to rate levels of agreement for each recommendation. The Likert scale was divided into intervals as follows: strongly agree equals 3.01 – 4.00, agree 2.01 – 3.00, disagree – 1.01 – 2.00, and strongly disagree 0.00 – 1.00. The result of the weighted mean test indicates that all the recommendations stated seem, in general, to be fairly convincing to the clients/client representatives, design consultants, contractors, sub-contractors and ‘others’. That is due to the overall average response being 3.51 which can be interpreted in terms of level of agreement as falling midway between ‘Agree’ and ‘Strongly agree’. In terms of each individual recommendation, the results indicate that the respondents to the Test Survey held very good attitudes towards ALL of the 31 recommendations. For more information about the number of survey values selected by the survey respondents as well as the weighted mean averages obtained for each recommendation, the reader is referred to Appendix H.

To measure overall survey numbers and weighted percentages of each recommendation against each research respondent, and to establish whether there were any significant differences or attitudes between the research respondents toward each recommendation, the researcher used SPSS statistical software to process all the data obtained. In addition, the statistical software Fishers Exact Test was used to recognise any statistically significant differences between the answers from the different groups of respondents, instead of the chi-square test because of the small numbers in some cells of the table. The test is used to test the null hypothesis that there is no difference between the groups in terms of their responses. If the p-value is less than 0.05 then we can reject the null hypothesis and conclude that there is a difference between the groups. However, for more description of numbers and percentages for each recommendation see SPSS result tables in Appendix I.

8.7.4 Discussion of Results

The majority of average responses towards the recommendations were at the level of ‘Strongly agree’, with the others being at the level of ‘Agree’. However, there was a very slight difference found with recommendation # 3 as most (40%) of the ‘Other’ selected ‘Agree’ and 33.3% selected ‘Disagree’. Details of the SPSS result tables are not included here due to space constraints, and the only results that are presented in this section are the numbers and percentages of the ‘Strongly agree’ cells. They appear in Tables 8.3 to 8.7. In addition, it is reasonable to expect that some Fishers exact test results do not warrant much discussion when the result of the Fishers exact test indicates there is no statistically significant difference.

Finally, throughout the discussion of the results which is developed in this section, quotations extracted from the interviewees in the main research effort are provided to support some of the arguments and interpretations made upon each recommendation discussed. Like the analysis and discussion presented in Chapter Five, this section also uses the data classification system as the basis for analysis.

Pre-design Phase

From the 11 PM Strategy data derived from the main interview exercise as classified and distributed according to the established data classification system, there are issues, procedures, processes, etc proposed by the research respondents reflecting six suggested project management strategies to be implemented in the pre-design phase:

Table 8.3: **Number and Percentage that Strongly Agree: Pre-design Phase Recommendations**

Type of questionnaire respondents	**Number strongly agree (%)**					
Recommendations #	***1***	***2***	***3***	***4***	***5***	***6***
Client/Client Rep	55 (71%)	59 (77%)	24 (31%)	60 (78%)	23 (30%)	48 (62%)
Design and Consultant	58 (62%)	66 (71%)	83 (41%)	65 (70%)	35 (38%)	55 (59%)
Main Contractor	68 (62%)	75 (69%)	5 (77%)	64 (59%)	37 (34%)	52 (48%)
Sub-contractor	15 (94%)	12 (75%)	51 (31%)	17 (75%)	8 (50%)	10 (63%)
Other	11 (73%)	9 (60%)	4 (27%)	11 (73%)	5 (33%)	90 (60%)
Total	207 (67%)	221 (71%)	122 (41%)	112 (69%)	108 (35%)	17 4(57%)

Good Project Briefing Exercise

The conflict data suggests that due to unclear project requirements and objectives, and ineffective information assembly during the design briefing, which have been reported as latent conditions, conflict over the implications of additional cost and time emerged. This relationship, which is illustrated in Figure 5.7 (Chapter 5, section 5.3.1), has also been empirically confirmed by Lock (2007), thereby emphasising the importance of an effective project briefing process to avoid potential changes later in the project life cycle and quite possibly when the construction process is under way, over the design document. Therefore, in order to ensure that the project briefing exercise is effective, inexperienced project clients are advised to have professional client advisors or representatives involved at this very early stage in the design phase. Professional client advisors or representatives would help clients identify their needs clearly and ensure that any inexperienced project client representatives express the project's objectives and requirements comprehensively and accurately to the architects. This strategy would minimise and possibly avoid the extra costs and time resulting from change orders made by the client. This recommendation is clearly stated by research participant FH19 as follows:

> "We have faced this problem a number of times where the client representative in the government sector had no experience to explain his project design needs and requirements which as a result make the design drawing change orders multiple times at even then the design finally completed. There it is important to appoint an experienced client representative." (FH19-15/PM)

In addition as indicated in Table 8.3, most Recommendations Test Survey (RTS) respondents strongly agreed with this advice (67%). However, there are some noticeable statistically significant differences (Fishers exact =18.99, p=0.008) between the respondent groups. The sub-contractors indicated a very high level of strong agreement (94%) with the recommendation that clients should have professional client advisors or representatives to help them at the project briefing stage, whereas the other respondent groups whilst still in agreement, were less so (for more description of numbers and percentages (see Appendix I).

Still on the theme of project client inexperience and their inability to conduct an effective project briefing, interviewees FH19and EA20 pointed out (in section 5.3.1

Chapter Five) that project owners and/or their representatives are sometimes not fully aware of the importance of the project briefing process, and therefore they do not assemble the design information properly. As a result, project owners and/or their representatives are advised to become more seriously involved and participate fully in order to conduct an extensive project briefing and establish adequate and clear information about project aims, objectives and requirements.

This project management point was also clearly encouraged by 71% of RTS respondents with no statistically significant differences (Fishers exact=8.516, p=0.679) between the groups in this respect.

Accurate Early Cost Estimation

Early cost estimation is also warned against. Specifically, research participants M03 and MG22 suggested that early cost estimation can be problematic since it does not usually reflect the reality of the cost of a project, and they argue that the preliminary design document should be integrated within the process of cost estimation since this would help to prepare more accurate figures. Research respondents ST21 and MG22 attributed early cost estimation as latent conflict since the figures arrived at were based on incomplete design information, and consequently conflict emerged at a later date (discussed in section 5.3.2 Chapter Five) because of discrepancies between costs later claimed and those in the initial estimate. This suggestion for changed project management procedure was made by research respondents M03 and MG22 and as stated in section 5.3.2 in Chapter Five, both of them argued that the basic design should be used to make more accurate early cost estimation.

Indeed in the Recommendations Test Survey, 40% of respondents were in strong agreement with the idea that the design documents should form the basis of the early cost estimation, and another 42% agreed with the idea. It was noticeable, however, that a statistically significant difference was obtained between the respondents' groups. This difference was obtained from the 'Others' (33%) and the sub-contractors (25%) as they indicated disagreement with this recommendation. (For more description of numbers and [percentages, see Appendix I).

Early Selection and Acquisition of Project Site

It was also recommended that project owners work on the matter of choosing and gaining access to their project site in this pre-design phase in order that contractors had a proper idea of the site of the project for which they were going to bid. This recommended emerged because of the delays that were documented as a result of the project owner realising late in the construction phase that the intended project site could not be acquired after all or did not meet the project objectives and requirements. This project management process which was pointed out by respondent JS12 is discussed in section 5.3.3, Chapter Five. The suggestion met with much agreement in the Recommendations Test Survey as 68% of respondents strongly agreed with it, and there were no significant differences in the attitudes (Fishers exact =16.37, p=0.116) expressed between respondents' groups.

Contract Provisions for Unforeseen Sub-surface Conditions

The project owner as one of two parties in the PWC expects the main contractor to perform a site or geotechnical investigation, review the structural design or foundation, and then provide his tender estimate. This is a logical path to follow, but it is not always possible to view the site and/or to have the knowledge of the outcome of a geotechnical investigation before the tenders must be submitted, as has been discussed in section 5.3.4, Chapter Five. This means that estimates must be submitted when there is still uncertainty associated with the unforeseen sub-surface conditions which may turn out to be unsuitable when excavated during the construction phase. Conflict problems concerning this are reported in section 7.2.3 Chapter Seven, and in light of these, interviewees AH17, EA20 and ST21 indicated that the PWC standard form of contract should be modified to allow for the cases where the tenderers are unable to see the conditions of the project site before they bid, and/or to account for the situation when the geotechnical report associated with the bids document fails to highlight sub-surface problems. They suggested that the PWC contract should include clear and detailed of provisions specifying how to deal with uncertainty associated with unforeseen sub-surface conditions of the project site and possible extra costs in the case of unexpected soil conditions which come to light at the construction phase. Research respondent AH17 (main contractor) highlighted this suggestion in the following:

> "The geotechnical report associated with the bids document may give you indication about the sub-surface condition of the ground but not 100%. The PWC contract within its conditions does ignore this and should have more detailed contract provisions to make the view clear in case of different ground condition was exposed at the excavation."(AH17-18/PM)

In addition, this particular project management suggestion received strong encouragement from the Recommendations Test Survey respondents, with 48% being in agreement, and a further 35% being in strong agreement. There was no statistically significant difference (Fishers exact= 7.018, p=0.120) between the groups of respondents in their responses to this particular recommendation.

Qualifications Based Selection for Architect Selection

The selection process adopted by the bid or tender administrator for a tender submitted by a architectural service provider, especially for large complex projects design work, is one that should be based on the Qualifications Based Selection (QBS) method, where contracts are given on the basis of competency rather than on the 'lowest price wins' method. This suggestion has been discussed in section 5.3.5 Chapter Five by research interviewee S04, who highlighted the need for a revision of the 'lowest price wins' philosophy practiced by Saudi Arabian government organisations and their agents, to one that is qualification-based since this would increase the chances of selecting more competent designers and thereby assuring better quality design work. This argument is also supported in the literature on the grounds that the 'lowest price wins' selection method is not appropriate for provision of services because any form of price competition drives fee levels down, thus reducing the quality of services provided. Within the Recommendations Test Survey, the respondents were in sound agreement with this suggestion, 34% agreeing, and 56% strongly agreeing.

Pre-constrction Phase

From the 11 PM strategy data derived from main interview survey as classified and distributed according to the data classification system element, there are issues, procedures, processes, etc, proposed by research participants reflecting nine suggested project management strategies to be implemented in the pre-construction phase:

Table 8.4: Number and Percentage - Strongly agree: Pre-construction Phase Recommendations

Type of questionnaire respondents	**Number strongly agree (%)**								
Recommendations #	***7***	***8***	***9***	***10***	***11***	***12***	***13***	***14***	***15***
Clients/C.Reper.	50 (65%)	55 (71%)	42 (55%)	44 (57%)	42 (55%)	34 (44%)	51 (66%)	30 (39%)	40 (52%)
Design & Conslt.	58 (62%)	65 (70%)	50 (54%)	56 (60%)	57 (61%)	67 (72%)	64 (69%)	35 (38%)	45 (48%)
Main Contr.	50 (46%)	71 (65%)	60 (55%)	56 (51%)	50 (46%)	47 (59%)	66 (60%)	36 (33%)	42 (39%)
SubContr.	8 (50%)	13 (81%)	6 (38%)	10 (63%)	8 (50%)	8 (50%)	9 (56%)	9 (56%)	5 (31%)
Other	9 (60%)	13 (87%)	4 (27%)	7 (47%)	12 (80%)	9 (60%)	10 (66%)	6 (40%)	8 (53%)
Total	175 (57%)	217 (70%)	162 (52%)	173 (56%)	169 (55%)	182 (59%)	200 (65%)	116 (37%)	140 (45%)

Adequate Utilities Service Data and Information

In this project phase where the three main design documents namely, design drawings, specifications, and bill of quantity (BOQ) are developed, three PM Strategy data were derived from the main interview survey exercise with research participants Y09, EA20 and SS26 concerning utilities services. They made a general suggestion, as indicated in Table 5.6 (data #63) in Chapter Five, that as the project designers prepare the design documents for their project owner, they should include all the relevant data and information regarding the further project requirements and extra costs associated with making utilities services available or connected to the project building or facility. This suggestion applies to both the project owner and the main contractor who should prepare a clear contractual agreement which can anticipate any further requirements and costs that may arise, and this agreement is needed in an early stage of the project before reaching the construction phase. It was suggested by the research participants in response to the various conflict problems which were discussed in section 5.3.6 Chapter Five in connection with the circumstances arising when some main contractors tried to connect utilities services to their building projects, and found that extra time was required and/or changes that were outside the scope of the contract had to be made to allow the installation of the utilities services.

In the Recommendations Test Survey, 57% of respondents strongly agreed with this recommendation, and a further 40% agreed.

Meetings with Construction team at Design Development Stage

It was suggested by interviewees Y09 and SS26 that regular meetings should be conducted during the design development stage between and within design teams and different discipline experts to be involved in the construction works, such as the project manager, structural engineer, mechanical engineer, etc, to produce the necessary detail for the proper development of design documents. All of these research participants believed that such regular meetings would promote communication and co-ordination among the design team and allow for better information sharing which would result in better solutions for design problems, thereby preventing greater problems during the construction phase. This suggestion emerged in response to some latent conditions of conflict pointed out and discussed in section 5.3.7 Chapter Five that were attributed to a lack of co-ordination and communication between the project design team and the structural engineer as in project PO26as well as between the project design team and some mechanical and electrical machinery suppliers which in both situations resulted in conflicts during the construction process. This suggestion can be noted in the following comment offered by interviewee SS26:

> “But unfortunately it was revealed that the structural design of the building was not able to support such a load, therefore, it was necessary to change the structural design to make the roof of the building bear all the weight … it should be regular meetings conducted at the design phase between and design teams and different project discipline experts to arrange and sort out such problem.” (SS26-17/PM)

This suggestion was supported by 70% of the respondents to the RTS, all of whom strongly agreed. In addition Fishers exact test showed no statistical significant difference (Fishers exact =9.138, p=0.695) between all groups of respondents.

Another specific project management process was suggested by research participant Y09 in respect of the latent condition of conflict originating from lack of co-ordination and communication between the designer and supplier/manufacturer. This suggestion was made because of the events experienced in PO9 where the main contractor faced difficulty finding a sub-contractor to supply and install some mechanical and electrical machinery in accordance with the 'uncommon' project building design. For that reason the architects and suppliers/manufacturers are encouraged to engage in early liaison, at the design development phase, to collectively check that materials/machines are well-suited for the architectural design before the commencement of the construction phase. The suggestion is extracted from the comment by Y09 which was as follows:

> "Lack of communication and co-ordination between the designer and the suppliers … this was reflected by most of the suppliers who pointed out that there was difficulty installing these machines … should be an early liaison between the architect and suppliers/manufacturers to check architectural design solutions for materials/machines to be installed before construction phase starts." (Y09-15/PM)

In fact, in the RTS, 52% of respondents strongly agreed and a further 41% were in general agreement, so it can be seen that 93% believed there was a need for this type of liaison.

Additional Service Fees for Design Change Orders

It was suggested by research participant FH19 that the Saudi Arabian standard form of contract for engineering and consultancy services (design) should contain further clear provisions to address the permitted scope of any design change requested by the project owner during the design development, and the potential extra service fees incurred should such change stray beyond the permitted scope. This suggestion (see section 5.3.9 Chapter Five) was intended to safeguard the designer against unreasonable demands on the part of the project owner, and the likelihood of additional costs involved in meeting those demands. Indeed, the idea found approval among the RTS respondents, since 56% of them were in strong agreement, and a further 35% were in general agreement.

Saudi Common Construction Law for Ambiguities and Discrepancies

It has been suggested that Saudi Arabian construction laws should be established to address any unsolved problems originating from ambiguous specifications documents that cause different interpretations by the project parties. Interviewee AS24 made this suggestion (see section 5.3.10, Chapter Five) in a more general sense to address any conflict problem resulting from faults, ambiguities and discrepancies within and between design drawings, specifications and BOQ documents. Moreover, the respondents in the RTS supported this notion since 55% were in strong agreement with it, and a further 39% were in general agreement with it.

Realistic and Adequate Timeframe for Developing design Documents

Conflict over delay in design work completion which has been attributed to insufficient time being given to the architect to develop all design drawings/documents, may also result in inadequate detail and poor design quality and documentation. In response to this conflict problem which was highlighted in section 5.3.11 Chapter Five, interviewee L10 suggested that the architects should be given realistic and adequate timeframes for developing design drawings/documents. In the RTS, this suggestion received good support, with 58.7% of respondents stating that they strongly agreed with it, and a further 39% being in general agreement.

Pre-qualification Process within the Tendering Process

It has been suggested by four research participants that a pre-qualification process should be integrated within the tendering process to examine each contracting company and their tenders with a view to establishing their capability to undertake the proposed work. Such a process is believed to be required before any contractors are selected and awarded the project. This issue was discussed in section 5.3.14 Chapter Five, the belief being stated that with such a pre-qualification process in place, project owners and/or their representatives would be able to make an informed selection, and hence, many potential later conflicts associated with contractor incapability, would never arise. At the same time, interviewee AS24 felt that a pre-qualification process would provide a viable alternative approach should to the current tendering selection process used by the government/public agents, which is based entirely on the concept of ‘the lowest price wins'. In the RTS, there was more support for this idea, since 65% of respondents strongly agreed with it.

In addition to recommendations for changes to the selection process of the construction team there is also another suggestion been pointed out in section 5.3.14 Chapter by interviewee AS24, who argued that the entire tendering process (bidding, evaluation, selection of contractor and sub-contractors, and final approval) should be carried out and completed before the construction phase starts, and not after. This suggestion was made in order to exclude any possible conflict arising due to delays occurring because sub-contractors have not been appointed in time, as happened in PO24. In the RTS, 37% of respondents strongly agreed with this recommendation, and a further 38% agreed, meaning that a total of 75% believed this was a necessary change.

Improve Public Work Contract (PWC)

It was suggested by six interviewees that the Public Work Contract (PWC) should be improved by incorporating various professional international standards within it. This suggestion in section 5.3.15 Chapter Five came in response to the conflict data offered by interviewees (see Data Table, Appendix D) to the effect that several contractual weaknesses as stated in data # 4, 34, 59, 79 and 65 (see Table no 5.16 Chapter Five) were sources of conflict. The following extract illustrates this suggestion derived from research respondent HS23's comment:

> "There are some professional contract such as fdic form of contract can be used to improve the PWC contract or maybe some other international standards. Some of these contracts have been have been built as a result of much feedback that has been taken during many years. We should take note of the advantages of these professional standards". (HS2314/PM)

This suggestion was also supported by the vast majority of respondents to the RTS, since 45% of them were in strong agreement with it, and a further 50% were in general agreement.

However, there was a noticeable statistically significant difference between the respondent groups. This difference was obtained from the 'Others' (33%) as they appeared less in the 'agree' (27%) category, and more in the 'strongly agree' (53%) category. (For more description of numbers and percentages, see Appendix I).

Construction Phase

From the 11 PM strategy data derived from the interviews, nine project management strategies were suggested as worthy of implementation in the construction phase. Table 8.5 shows details of the RTS respondents who strongly agreed with the recommendations in this phase.

Table 8.5: **Number and Percentages of Respondents in the RTS in Strong Agreement with Construction Phase Recommendations**

Type of questionnaire respondents	**Number strongly agree (%)**						
Recommendations #	***16***	***17***	***18***	***19***	***20***	***21***	***22***
Clients/C.Reper.	32 (42%)	46 (60%)	37 (48%)	52 (68%)	58 (75%)	45 (58%)	45 (58%)
Design & Conslt.	50 (54%)	57 (61%)	52 (56%)	51 (55%)	64 (69%)	59 (63%)	65 (70%)
Main Contr.	60 (55%)	57 (52%)	38 (35%)	70 (64%)	66 (61%)	55 (50%)	70 (64%)
SubContr.	5 (31%)	10 (62%)	15 (94%)	15 (94%)	8 (50%)	5 (31%)	31 (81%)
Other	3 (20%)	10 (67%)	11 (37%)	11 (73%)	12 (80%)	13 (87%)	11 (73%)
Total	150 (48%)	108 (58 %)	153 (49 %)	199 (64%)	208 (67%)	177 (57%)	204 (66%)

Continue Table 8.5 Number and % that Strongly Agree: Construction Phase Recommendations

Type of questionnaire respondents	Number strongly agree (%)				
Recommendations #	***23***	***24***	***25***	***26***	***27***
Clients/C.Reper.	45 (58 %)	35 (46%)	50 (65%)	30 (39%)	43 (56%)
Design & Conslt.	58 (62%)	46 (50%)	68 (73%)	38 (41%)	64 (69%)
Main Contr.	63 (58%)	57 (52%)	83 (76.%)	69 (63%)	69 (63%)
SubContr.	10 (63%)	5 (41%)	12 (75%)	10 (63%)	9 (56%)
Other	11 (73%)	10 (67%)	13 (87%)	5 (33%)	10 (67%)
Total	187 (60%)	153 (49%)	226 (73%)	152 (49%)	195 (63%)

Meetings with Design Team at Construction Phase

It has been suggested that regular meetings at the construction site involving both members of the design team and the construction site team should be held during the course of the construction process, even though design and construction are deemed to be separate activities. This probably would allow information as well as experience to be shared and exchanged in many different ways between the design team and construction team. This suggestion which was pointed out by two interviewees (M03 and AS24) was produced in response to a lack of communication and co-ordination in PO 03 and PO 24 where the design teams were not integrated into the construction team, and as a result, project requirements could not be fully realised by the main contractor. Basically, there were conflicts during the construction phase as noted by interviewee AS24 who said:

> "Some of the design documents were not passed on to the contractor in a proper way. The designer should have visited the building site regularly and communicated with the contractor face to face to appreciate the entire design picture … communication should be integrated within building projects of traditional approach method

> where the design phase and construction phase are separated activities." (AS24-06)

The suggestion received much support in the RTS, since 48% of the respondents were in strong agreement with the idea, and a further 45% were in general agreement with it.

Deployment of Contract Management

Three PM strategy data were derived from the interviews, specifically from S04, D06 and MA08, who assert that effective contract management principles should be deployed. However, this management concept which has been acknowledged in the literature, such as by the Office of Government Commerce (OGC), contains a key management tool in large-scale projects which can help to proactively anticipate and respond to the current and future project needs by employing a specialist with relevant experience. By doing this, many potential problems between the project parties could be prevented and resolved harmoniously. This suggested project management strategy was discussed and pointed out in section 5.3.17 Chapter Five. During the RTS, there was strong agreement with the idea from 58% of respondents and agreement from a further 39%.

Good Level of Construction Team Performance and Workmanship

Three project management suggestions emerged from interviewees Y09, JS12 and MS18 in response to poor performance and workmanship, in particular in respect of services provided by the design consultant, main contractor and/or sub-contractor. These suggestions which appear in section 5.3.19 Chapter Five contain project management strategies believed to ensure that a certain level of quality can be accomplished in terms of the project's team performance and workmanship. One of these suggestions proposed by interviewee MS18 was that during the construction period, the clients or project managers should be encouraged to make strategic early decisions on the possible exclusion of the main contractor or any sub-contractors when signs of a poor level of performance and workmanship become apparent. When advancing this suggestion, MS18 said he wanted to prevent any further poor workmanship emerging or further worsening of the situation due to poor performance or workmanship by the main contractor or sub-contractors. In addition, by taking this decision early in a project, it would also bring opportunities for another capable service provider (main contractor or sub-contractor) to be engaged to meet the required construction work skills and performance. In the RTS, support for the idea came from 49% of respondents who strongly agreed with it, and a further 40% who were in general agreement.

Another proposal to enhance the quality of performance from the project team was offered by interviewee JS12, who pointed out (section 5.3.19 Chapter Five), that the clients or project managers should regularly evaluate the performance of the design consultants since at the moment the focus was purely on the performance of the main contractor. This suggestion arose because of JS12's experience of project work in the Saudi Arabian public sector where the design consultants are not usually evaluated in terms of their work performance by client representatives or project managers, but where the main contractors are. The interviewee believed that by evaluating the design consultant, that person's performance would improve. Indeed, this suggestion found support in the RTS, with 64% of the respondents being in strong agreement, and another 33% being in general agreement. However, a statistically significant difference (Fishers exact=19.179, p=0. 0) did emerge from the sub-contractors when compared with other respondent groups, indicating very high strong agreement (94%) for this recommendation, and that indicates that contractors feel aggrieved at the poor level of design they are asked to work with.

Interviewee Y09 also suggested that the main contractors should be contractually committed to including quality control specialists within their project teams, and especially for large projects. He implied by making this suggestion, that the quality control team would ensure that the project specifications of construction materials used for project elements are not sub-standard, as can be understood from his statement:

> "Especially for large projects, sub-standard specifications of construction materials sometimes are used to structure the building by main contractors. Quality control team should be part of his building team work in the contract … to ensure that the main contractor is contractually committed to forming a quality control team to review and apply its principles." (Y9-25)

This suggestion received support from 64% of the RTS from research respondents who felt they were in strong agreement with it, and a further 31% who showed general agreement.

Early liaison with Utilities Service Local authorities and companies

It has been suggested that early proactive action to liaise with the local authority and utility company providers should be taken to make the utilities services available on the project site or/and connected to the project building before the construction phase starts. This project management suggestion was made by interviewees AH17 and EA20 as a means of avoiding conflict of the kind highlighted in section 5.3.20 Chapter Five. Citing his experience in PO17, interviewee AH17 believed that by being proactive in this respect, the extra costs associated with overcoming some of the obstacles encountered in trying to make these utilities services available and properly connected in the project building or facility, would not arise as potential problems could be sorted out in advance. Additionally, interviewee EA20 believed that had such early proactive project management action occurred in PO20 there would have been no adverse impact upon the project timeframe as actually happened by having to wait for the local authority to make the necessary connections. In this respect, he said:

> "Thus, this played a part in incurring extra cost and effort that was not addressed during the tendering phase and which consequently caused conflict between the contractor and the project owner in terms of who would bear this extra cost … Therefore early project team co-ordination and liaison between the local authority and utilities companies providers before the construction phase started to ensure the implementation of utility services is not adversely affect the construction phase schedule make it more longer". (EA20-21/PM)

In the RTS, this recommendation received further support, with 57.1% of the respondents being in strong agreement, and an additional 37.7% being in general agreement.

Purchase or Supply Orders should be in writing

It has been suggested that any verbal purchase or supply order made by one project party on behalf of the other should not be considered unless there is a written letter approving the order. Interviewees L10 and MK29 raised this issue because of conflict (pointed out in section 5.3.22 Chapter Five) where the sub-contractors in PO10 and PO29 purchased and supplied some project materials and brought them onto the project site without having written permission from the project owners to do so. In the case of PO10, the project owner rejected the materials concerned since they were not what he wanted, and similarly, in the case of PO29, the project owner changed his mind about materials already supplied by the sub-contractor. The interviewees relating these difficulties (L10 and MK29) argued that as a general rule, any materials required for the project should always be supported by written documentation in advance, i.e. a submittal letter approved by the liable person (e.g. project owner) before purchase of those materials is made. Such a strategy would determine responsibility and avoid the type of conflict witnessed. MK29 put this clearly, saying:

> "Main contractors or sub-contractors have been ordered to make purchase or supply on behalf of the other project party should be always written though a submittal letter. Any verbal order purchasing or supplying should not consider as a valid order accept though written a submittal letter approved by the liable person in writing". (MK29-03/PM)

In the RTS, this suggestion received support from 66% of respondents who strongly agreed, and 30% who were in general agreement.

Keeping Receipts and Records

It was suggested that project parties, especially contractors, should keep receipts and records of any financial outcomes resulting from construction changes or variation orders made by project owners to modify or change a building element already constructed by the main contractor during the construction process. This argument was proposed by interviewees D06 and Ak13 (in section 5.3.23 Chapter Five), in response to their experience that contractors often had to cover extra costs associated with such variation orders themselves because they had not kept receipts or a proper financial record indicating how much these additional expenses were. Therefore, it is recommended that in order to validate any requests for payments in this respect, and certainly in the event of any legal appeal, official documentation should be kept. This project management procedure is pointed out clearly by interviewee Ak13 as follows:

> "These receipts and records should always be kept in a file to be provided as needed to prove anything was happened out of scope of

> the contract. It is important for every one especially, the contractors". (Ak13-07/PM)

In support of this recommendation, 60% of respondents to the RTS showed strong agreement, and a further 36% indicated general agreement.

In addition to this suggestion, there was a further general project management recommendation coming from interviewee R01 in connection with conflict originating from variation orders during the construction process. He pointed out that negotiation as a dispute resolution tool should be the preferred method to settle any disagreement or dispute between the project parties over such problems, saying:

> "Variation orders always cause problems and make conflict in projects. PWC contract referred the disputed parties only to Diwan Al-Mathalem (the Board of Grievances). However, rather than using time-consuming dispute resolution tool, they should settle their dispute by negotiation". (R01-13/PM)

Support for this recommendation came from 94% of the RTS respondents, 49% of whom were in strong agreement with it, and the remaining 44% indicating their general agreement.

Furthermore, it has been suggested that project parties, especially main contractors, should have formal written records indicating all reasons why any project handover delay has occurred. Such reasons will obviously be the result of obstacles during the construction process. Interviewees D06 (see section 5.3.24 Chapter Five) and Ak13 raised this issue, as an important matter concerning the situation where it is necessary for contractors to provide evidence of lateness causes, and thereby exonerate themselves from responsibility if indeed the problems have not been their fault. The importance lies in the fact that delay penalties may be imposed upon the main contractor unfairly. And this is seen as a crucial issue by respondents to the RTS since 73% of them indicated they were in strong agreement with the recommendation.

Clear Method of Payment

It has been suggested that the method of payment set in the PWC standard form should be changed to allow an interim payment to be made by the project owners to the main contractors during the construction process. This was a general recommendation discussed in section 5.3.25 Chapter by interviewee Y09 who pointed out that this change would help contractors financially and assure their continued provision of good quality materials and workmanship. According to PWC Article 50b, payment is not to be made until the construction work is completed, but it is recognised by Y09 that contractors must have sufficient funds to purchase and supply the required project equipment without incurring any financial difficulty during the construction process. In fact, there was much support for this recommendation from the RTS respondents, since 49% strong agreed, and a further 44% showed their general agreement.

Further general suggestions to the method of payment set out in the PWC standard form were made by interviewees M03 and EM16 (section 5.3.25 Chapter Five). They felt it was necessary to provide contractors with more adequate provisions to clarify the payment mechanism in terms of when they are likely to be paid by project owners in accordance with the actual project progress or completion. Their criticism was that the lack of detail in this respect leaves it open for many different opinions or interpretations by project parties over this matter, which could become a source of dispute between the main contractor and the project owner as mentioned by interviewee EM16 in project PO16 (see section 5.3.25 Chapter Five). Again, there was support for the implementation of the recommendation by respondents to the RTS since 63% strong agreed, and a further 35% were in general agreement.

Commissioning and Completion Phase

Only one PM strategy item relating to the commissioning and completion phase was derived from the interview exercise. Table 8.6 provides information about the agreement from the respondents in the RTS.

Table 8.6: Number and Percentages in Strong Agreement: Commissioning and Completion Phase Recommendations

Type of questionnaire respondents	**Number strongly agree (%)**
Recommendations #	***28***
Clients/C.Reper.	49 (64%)
Design & Conslt.	67 (72%)
Main Contr.	64 (59%)

SubContr.	12 (75%)
Other	10 (67%)
Total	2 (65%)

Fairly Conduction of Commissioning and Completion process

In this project phase, the construction works are completed and the project is handed over to the owner. As indicated in section 5.3.26 Chapter Five, one PM strategy data emerged in this phase, and this was highlighted by interviewee LA15, who stated that the final check of the project should be conducted by a person with adequate construction project experience as well as credibility to perform this job professionally, and that at the same time that individual should act fairly and without any prejudice. This recommendation was made in response to a conflict experienced by this interviewee when the client's representative was lacking in both construction experience and credibility, and conducted the completion check unfairly since he did not have the expertise to perform this properly. His feelings are expressed in the following extract:

> "The client representative was incompetent when doing this job. He was 'often offhand' during assessing and reviewing the project completion process … this job should be conducted by an appointed person with adequate construction project experience as well as credibility to perform it professionally as well as fairly". (La15-16)

A large proportion of the respondents in the RTS supported this recommendation, 65% showing strong agreement and a further 32% showing general agreement.

General Administration and Regulation

From the one PM strategy item derived from the interview exercise, just one recommendation for project management strategy emerged in the area of general administration and regulation. Table 8.7 provides details of the numbers of RTS respondents in agreement.

Table 8.7: Number and Percentages in Strong Agreement: General Administration and Regulation Recommendations

Type of questionnaire respondents	Number strongly agree (%)		
Recommendations #	***29***	***30***	***31***
Client/Client Representative	31 (40%)	34 (44%)	34 (44%)
Design and Consultant	50 (54%)	50 (54%)	50 (54%)
Main Contractor	48 (44%)	42 (39%)	42 (39%)
Sub-contractor	8 (50%)	6 (38%)	6 (38%)
Other	11 (73%)	9 (60%)	9 (60%)
Total	148 (48%)	141 (46%)	46 (141%)

Modification to Contractors' Classification System

It was suggested that modification should be made to the law relating to contractors' classification system to preclude contracting forms from being awarded too many public sector construction projects at the same time. Essentially, the recommendation is for the imposition of a strict limit since it is pointed out (section 5.3.25, Chapter Five) by interviewee M03 that without such restrictions, contracting firms bid for projects which are beyond their realistic capabilities, and then engage in 'selling' of these contracts to other contracts, while pretending to be completing them themselves. This is a fraudulent practice, more information about which is in section 5.3.28 Chapter Five, and section 7.2.5 Chapter Seven. This particular recommendation received support from the RTS respondents, 64% being in strong agreement.

Using Alternative Dispute Resolution Tools

Four types of PM strategy data were derived from ten research participants duringthe interviews survey and these centred upon two main ideas, both regarding the means of improving the practice associated with the national dispute resolution regulation in a way that discourages as much as possible, litigation as the dispute resolution tool. Instead, the suggestion is to encourage other quicker and less expensive tools such arbitration. So, the first recommendation (section 5.3.30 Chapter Five) from interviewees Ab02 and S04 concerning Article 57 in the PWC which enforces litigation as the only dispute resolution method available in the case of the project owner (government/public agent) as an opposing party (main contractor) is that this should be changed in a way that allows an additional option, namely arbitration. This suggestion also involves an amendment to the Saudi Arbitration Law (Article 3) that decrees cases involving government agents (project owners) in dispute with other parties (main contractors) must go to the Diwan al Madhalim (litigation system), with no recourse to any other type of solution.

The second recommendation (also pointed out in section 5.3.30 Chapter Five) (see data #27 and #33 in Data Table, Appendix D) affirms that regulatory legislation and institutions such as an arbitration centre should be established within the country to encourage arbitration, and that these should be supported by other alternative dispute resolution tools such as negotiation, mediation and conciliation which in themselves should become the most favoured dispute resolution tools for conflicts emerging within the Saudi Arabian construction industry. This recommendation comes as a means of promoting a project management strategy to provide alternative dispute resolution practice by encouraging the disputants of construction project parties to use more channels to resolve their secnereffid or disagreements with the least harmful outcome possible.

Both recommendations received support from the RTS respondents. The first attracted strong support from 58% of the respondents and general agreement from another 44%, and the second showing that 46% were in strong agreement with it, and a further 50% were in general agreement.

8.8 Conclusion

The overall response to the RTS showed significant agreement with all the 31 recommendations. Responses came from 310 Saudi Arabian construction project participants comprising project owners/clients' representative, design consultants, main contractors, sub-contractors and some in other categories, and they all agreed that the proposed project management strategies aimed at preventing and/minimising conflict, are valuable. There are statistically significant differences of opinion between the types of research respondent in respect of four recommendations: pre-design phase *Recomm 1* and *Recomm 3*, pre-construction phase *Recomm 5* and construction phase *Recomm 19*. It is recommended that in order to expand the learning process so far, and to help improve the current project management strategies in terms of conflict avoidance or reduction, further qualitative research and quantitative checks on the recommendations with various project participants (project owners, contractors, sub-contractors and others) can be conducted.

CHAPTER NINE

Framework of Conflict Avoidance

9.1 Introduction

This chapter presents a framework designed to help those professionals participating in building projects, whether at individual, group or organisational level, who are interested in avoiding or minimising potential conflicts which may emerge during any building project process or activates. The chapter indicates the way in which the framework operates through providing an explanation of the function of each unit set up within the framework. In fact, the core processes in this sequence of units follow the core process steps taken to perform this research project. Therefore, the chapter simply provides a description of the main role of each of these units, to provide the reader with a general understanding of how the framework works while any further information can be obtained from the preceding chapters, namely Five, Six, Seven and Eight.

9.2 Description of Conflict Avoidance Framework

9.2.1 The Main Concept of the Framework

The framework is based on the concept of the feedback process, whereby, for example, any wrong management practices or decisions when applying or implementing a particular system or procedures or processes, and so on within a particular work process can be recognized and utilised as a lesson learned to improve the said system, procedures or procedures in a later and similar work process or situation. Similarly, this principle of feedback can be applied to any particular management aspect of a construction project or process where common elements such as systems, procedures and processes are implemented**.**

To put it another way, this framework is designed essentially to flag up conflict causes which can be considered as a source of knowledge resulting from incorrect project management practices from which lessons can be learned. This will enable project managers to become more aware and produce proactive project management decisions in the form of effective project management strategies (PM strategies) which can be considered as an output to be used to avoid persistent reoccurrences of potential causes of conflict in current or future construction projects or processes. A full description of how the framework works is provided in Section 9.2.2 below.

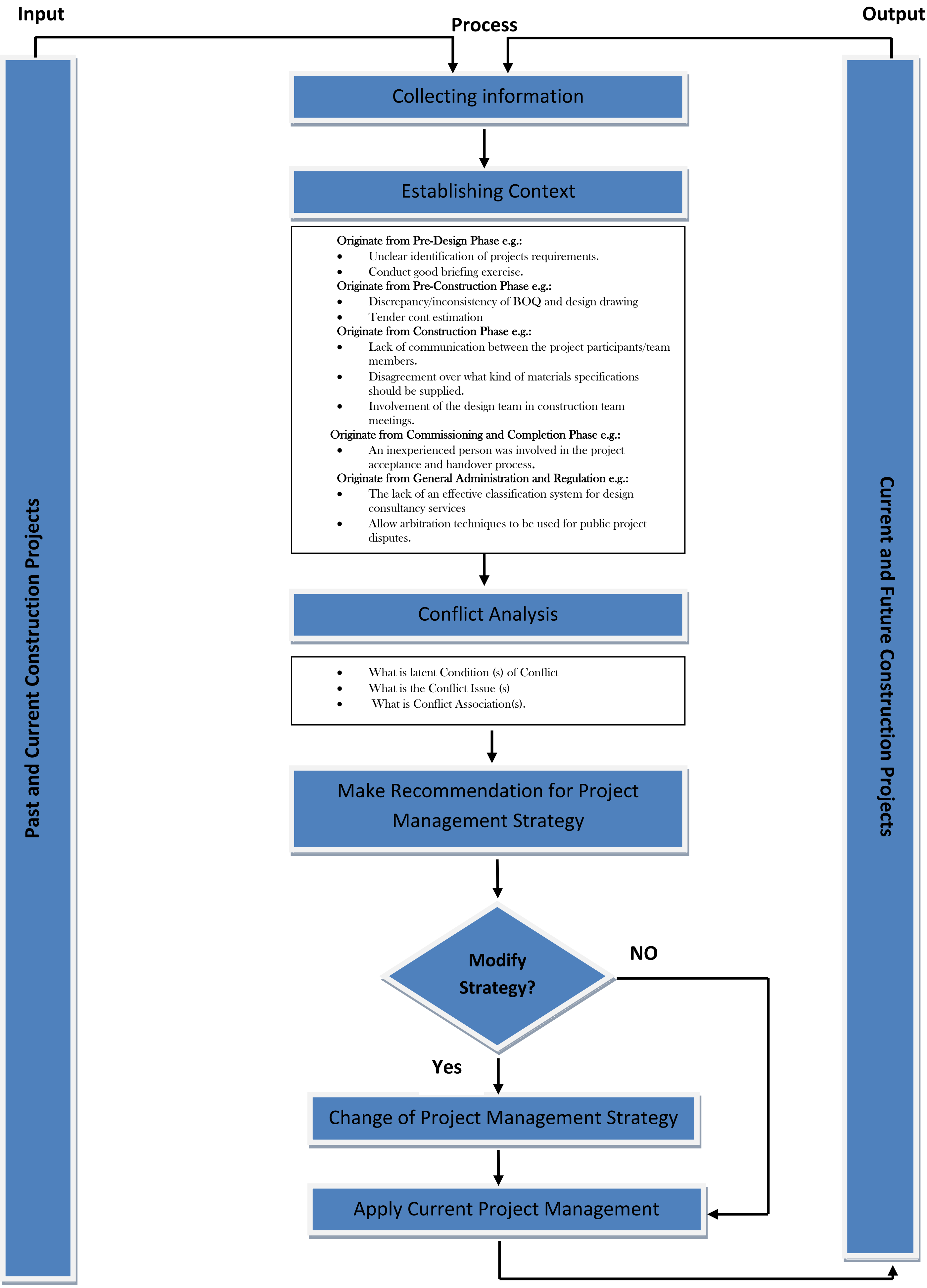


Figure 9.1: Framework of Conflict Avoidance

9.2.2 How the Framework Operates

The conceptual framework, as indicated in Figure 9.1, represents a sequential process that could be adopted by any individual, team or organisation concerned with identifying the causes of conflict and reducing or avoiding their impact early in the strategic phases of any construction project.

The first unit contained within the working process of this framework is called the Collecting Information Unit. Its primary aim is to collect information, namely data concerning the causes of conflict between project parties or participants, and project management (PM) strategy ideas regarding how these conflict causes can be avoided or minimised. These two types of information or data should be collected with the help of project participants or those who have already experienced or are familiar with certain conflict conditions and events, possibly as a result of their involvement in previous construction projects. In this framework all of the information and potential data sources are gathered together and considered as data input. These combined data sources should be generated by a framework administrator with responsibility for implementing the framework. It is important that this person involves all project parties or participants in reviewing and analysing all the conflict events within construction projects that have been already completed or are in the final stages of their handover. This will ensure that the inter-relationship of both conflict variables – those indicating where conflict originated from (latent condition of conflict) and the actual conflicts occurring at any time during the life of the project - can be reported. In turn, this would generate a meaningful understanding of the conflict associations throughout the life cycle of any project, as indicated in the various examples mentioned in the discussion and analysis in Chapter Five and as also appearing in Section 7.3 of Chapter Seven.

For this framework to be properly operationalised, the framework administrator must begin to feed it with the required inputs in terms of specific conflict causes and PM strategy ideas. These inputs are in essence, the knowledge and experiences of past events and practices within the context of previous construction projects. The collection of this data can be via direct conversation between the administrator and professionals or other key project participants. And during these conversations, the administrator should encourage participants to speak freely about any conflict causes and conditions, and what could be done to avoid them. Any member of the project team who has useful and appropriate information should be sought. Furthermore, tangible forms of evidence such as reports or any relevant formal documents can also be used as a source of information. The data required from the participants or documentary sources are of two types: the first type should arise out of deep discussion about what conflict causes have led to a particular conflict occurrence during any phase of the project's life cycle. The second type of data consists of suggestions for project management strategies from those interviewed regarding their own responses to each conflict situation which they would have outlined during the first part of the discussion.

When all the information has been collected, it should be fed into the Establishing Context Unit, the primary aim of which is to process the information by creating a classification context which may be accomplished by using the same method by which the data classification system already described in Section 4.7.4.1**,** Chapter Four. The framework administrator must play a key role in classifying all the information and data collected in a structured way by establishing a single classification system, which can be the same as the one established and adopted in this research project, or different according to the administrator's decision about what is suitable for the nature of the information retrieved from the various participants. In truth, any classification system approach can be adopted as long as it is comprehensive and can accommodate all the information regarding conflict causes and PM strategy ideas.

As soon as the framework administrator has collected and classified of all the information, s/he can begin to undertake an analysis of the conflict causes to ascertain whether there is any potential that these may arise in future construction projects. This analysis is performed in what is called the Conflict Analysis Unit as shown in Figure 9.1, which is established to conduct an analysis of each conflict event reported and classified by the previous two units in the framework. In order to conduct this analysis, the framework administrator should engage in a deep examination of the issues by asking three questions for each conflict event reported. These three questions are: *what are the latent condition(s) of conflict*, *what actual conflict issues do project parties or participants disagree upon,* and *what are the conflict associations between these two conflict causes or variables*.

The framework administrator is expected to undertake an in-depth analysis to differentiate between the two variables, namely latent conditions and actual conflict data, for each conflict event. Through the joint analysis of these two types of conflict data, conflict associations can be identified. Specific standards to measure the level of conflict intensity for each conflict event, for example Pondy's (1967) five stages of conflict, can be adopted by the framework administrator to produce as precise an evaluation as possible so that latent conditions and actual conflict data can be clearly differentiated and identified. In this aspect of the framework, with an accumulation of information, a conceptual model of causes, such as the one indicated in Chapter Seven, Section 7.3 can be developed.

Once the analysis of conflicts is completed, the next aspect of the framework process requires the formulation of recommendations for project management strategy, which are based on the identification and analysis conducted in the first three aspects. This process is established in a separate unit within the framework called 'Making Recommendations for Project Management Strategy'. At this point, the PM strategy ideas are brought into play so that each conflict cause is given a suggested project management strategy to ensure the cause does not materialise into a genuine instance of conflict. However, it must be recognised that any proposals suggested for incorporation into strategies need to be properly tested, and hence, the framework administrator is required to conduct a testing exercise for each of the project management strategies generated. This requires the administrator to reformulate the proposed project management strategies into questions, in preparation for a testing exercise in which the questions are put to the relevant project participants or experts. These questions may be posed in the form of recommendations of current project management practice to be applied. As soon as these questions or recommendations are ready to be investigated, the framework administrator is expected to conduct a physical testing exercise to obtain some final results. Thereafter, the emergent results indicate whether the strategic management ideas are capable of implementation without amendment or whether they need modification. This testing process is entitled 'Modify Strategy?' as shown in Figure 9.1. If the test results of any particular strategic management idea emerge as positive, then the strategy is passed to the next unit in the framework which is called 'Change of Project Management Strategy'. On the other hand, if the result is negative, then the idea is not considered suitable for application, and will remain as a current project management practice with no recommendation for its amendment in any way.

The primary aim of the Change of Project Management Strategy Unit is to make plans and take decisions regarding the action necessary for changes to existing project management practice. In this respect, certain actions may need to be taken regarding management, processes, procedures, local or national laws, regulations, and so on, all of which may need to be modified in order to increase the possibility that potential conflict causes within future projects can be reduced or avoided. At the same time, some of these ideas may relate to a decision that has to be taken by an external organisation such as a local authority, city council, etc, and in such circumstances that organisation might wish to conduct its own investigations to ensure the ideas are feasible and can be adopted. Examples of these strategies are pointed out in the descriptions given below, which contain project management strategies that can be applied or modified to avoid conflict. All in all, there are five brief examples indicating the results of data analysis carried out in this research project. Each example has been through a testing exercise and belongs to one of the five elements of the classification system which shows the emergence of the relationship between the conflict variables and management strategies.

Pre-design

Conflict between the client representative and the main contractor takes place over who will undertake to meet unexpected extra costs arising out of unforeseen soil conditions, as extra expenditure is needed to improve the building site's soil condition. The proposed project management strategy to be applied to minimize or avoid this type of conflict is for the contract conditions not to simply state or describe parties' commitments regarding geotechnical and soil testing, but to contain clear, detailed provisions specifying how to address this kind of uncertainty.

Pre-construction

A lack of compatibility or constructability between the design document/drawing and the actual construction can lead to conflict between the project parties in several ways. Therefore, concerted action should be taken by architects and other related project members such as structural engineers and materials/machine suppliers, to make early contact with each other by holding meetings or using other forms of communication in order to review the situation and ensure that they have as perfect a design document/drawing as possible before the construction phase begins.

Construction

Since it is the case that some main contractors and sub-contractors operate at poor levels of performance and workmanship during the construction phase, it is suggested that the project owner or project manager make decisions as early as possible concerning the question of excluding them from the project as soon as any clear signs of poor performance or workmanship become apparent.

Commissioning and Completion

Only a person who is acknowledged to have a high level of experience as well as credibility should be appointed to oversee the process of commissioning and completion. In this way there would be less chance of appointing an individual who might be unprofessional in terms of making observations or checking progress, or who might act in a self-serving manner.

Administration and Regulation

Certain contracting or sub-contracting firms tend to illegally transfer their public sector contractual obligations in full or in part to other contractor firms as a result of having committed themselves to more projects than they can realistically handle. This frequently results in various kinds of conflict and problems which could have been avoided. Therefore, the regulator should impose a law to address this problem by determining an upper limit for the number of projects which can be undertaken by a single contractor/sub-contractor.

After the required planning and decision-making associated with the implementation of amendment of the strategic management ideas has occurred, the next stage in the framework - Apply Current Project Management Unit – is approached. This is the final stage during which the strategic project management ideas identified as pertinent to address the potential causes of conflict in a project, are implemented.

Finally, as the framework becomes more mature with use and its accumulation of more information gathered about previous projects, so too does the store of knowledge regarding potential ways of making improvements in the battle to remove or reduce potential causes of conflict become greater. This represents a valuable learning process which arises from continually seeking to enhance the chances of success in combating conflict. Armed with this feedback mechanism, project management strategists are able to proceed with more efficient conflict and strategy analysis enabling them to investigate new areas of conflict causes and to produce further recommendations in terms of how to avoid or minimise these..

9.3 Conclusion

It is a basic and common principle of the feedback process concept that any knowledge obtained from experience and past construction projects or processes can be employed to improve similar construction projects or processes in the present or future. In the same way, the experience gained by project participants from construction conflicts can be employed to develop new construction management strategies and regulations in order to avoid or at least minimise any damage that might be incurred from conflict in future projects.

The more the framework operates and is provided with more conflict data, the greater the cumulative knowledge which can be established, therefore reducing the risks and uncertainties often associated with lack of knowledge. In addition, this will hopefully enable project managers to predict potential conflicts, as well as provide a valuable body of knowledge to promote more efficacious strategic management practices.

CHAPTER TEN

Conclusions and Recommendations

10.1 Introduction

From the discussion and analysis presented in section 5.3.1 to section 5.3.30 in Chapter Five, it can be asserted that ubiquitous causes of conflict exist within Saudi Arabian architectural projects, and that there are sophisticated inter-relationships between the antecedents of conflict and the actual incidence of conflict across a broad range of areas in all the major project stages.

In an effort to deal with this ever-present problem, this study has suggested a number of project management strategies which are offered as a set of recommendations for implementation. These strategies are derived from a detailed exploration of the potential causes of conflict, and are considered to eradicate such causes or at least reduce them, and thereby reduce the actual incidence of conflict. Chapter Five has presented the strategies and in Chapter Eight, they have been discussed in detail.

In presenting these strategies it is believed that the objectives of the study which appear in Chapter One have been met. For convenience these are now repeated.

(1) To identify the inherent causes of conflict inherent within large architectural building projects in Saudi Arabia, and why they exist.

(2) To test the validity of the research data used to identify these causes of conflict.

(3) To explore the 'conflict associations' between the latent conditions of conflict and the actual issues of conflict.

(4) To identify project management strategies for preventing or reducing the incidence and impact of conflicts.

(5) To explore the extent to which such project management strategies could be implemented within the Saudi Arabian construction industry to manage harmful conflict

(6) To develop a generic industry framework providing project managers with a mechanism to identify further conflict, prevent and or control it.

These objectives have been achieved as follows:

In Chapter One, a clear indication of where the research was directed was provided. The background to the study, the rationale for pursuing it, its aims, objectives, and scope were all presented to serve as milestones. Additionally, some introductory background information relating to conflict in the construction industry in general and in Saudi Arabia in particular, was presented to assist the subsequent reading.

A comprehensive review of the conflict literature has been undertaken and documented in Chapters One, Two and Three with the intention of developing an understanding of the theoretical background supporting the work in the subsequent chapters, and helping in the formulation of the research questions. Chapter Two specifically addressed the concept of conflict, considering this from its various angles – as a social phenomenon, its antecedents, processual development, and levels of conflict. All of these dimensions were shown to be capable of being used as a means of analysing the strength of a particular conflict, and possibly diluting it. In Chapter Three, a further literature review was provided to support the work in subsequent chapters by focuses particularly on conflict within construction projects. The research methodology was detailed in Chapter Four, which chapter highlights the several processes undergone, and the approach taken to obtain data from individuals within the Saudi Arabian building projects industry, namely through the use of semi-structured interviews and a questionnaire survey. Additionally, the chapter indicates how the data have been processed, thereby showing the academic rigour of the study. The findings from the thirty semi-structured interviews are presented and discussed in Chapter Five, and the findings from the questionnaire survey are analysed and discussed in Chapter Eight. However, the data analysed and discussed in Chapter Five, referred to as Conflict Data, are also used for validation test exercise presented and discussed in Chapter Six. The result of this data validation test exercise shows that the research participants confirmed that the researcher's interpretation of the conflict data generated by the interviewees was valid. In Chapter Seven, a summary of all the identified conflict areas inhered within building projects in the Saudi Arabian construction industry is provided, as are all of the relationships that were dscovered between the two types of conflict causes (latent conditions and conflict). Fishers Exact Test shows some of these inter-relationships to be statistically significant, and these are therefore referred to in the research as 'conflict associations'. In Chapter Eight the recommended PM strategies are presented. These are offered as a means of improving project management by preventing and or minimising conflict, and they are analysed and discussed. The Recommendations Test Survey which was conducted to test these data emerge in the form of project management recommendations and show the overall response to all of these proposed suggestions or recommendations, which respondents agree are valuable Finally, Chapter Nine has produced an industry framework based on the outcomes of the entire research process. Using this framework the construction industry can more effectively incorporate new knowledge in respect of conflict identification and project management strategies. This should enable project managers to predict potential conflicts, and provide a valuable body of knowledge to promote more efficacious strategic management practices.

10.2 Research Methodology vs. Research objectivises

To a certain extent there is diversity within studies in this field (shown in Tables 3.1 and 3.2 in Chapter Three), in terms of the research methodology adopted to collect and process project conflict variables. One method involves the use of questionnaire surveys to gather experts' opinions on matters reported in secondary data, for example that from published legal cases, which can be quantified using hard statistical methods. This is a common method. The other approach adopts a qualitative philosophy, dividing the conflict variables into two types of conflict data using the same or similar concepts of conflict and latent condition, as applied in this research project, and this strategy is less common. However, from the standpoint of conflict analysis, this method is useful for an analytical exercise which aims to distinguish between apparent causes of conflict such as 'variation orders by the client' (conflict) and the 'client's lack of experience' (latent condition).

This approach to conflict analysis is helpful for acquiring an in-depth understanding of the research problem through the main data collection survey. This appreciation subsequently enables the identification of relationships between the conflict variables, and then to offer a 'roadmap' obtained through deepening the understanding of the problem, to describe an effective management strategy. However, a key concern was that the conflict variables identified should reflect as many aspects as possible, of building projects. To achieve this, two methodological elements were considered: the first element consisted of semi-structured interviews, conducted with the involvement of all key industry respondents or parties, namely project owners, consultants, contractors, and sub-contractors. This approach perhaps offered a more comprehensive view of the conflict variables which would not otherwise have been achieved, as each type of research respondent tends to focus on his own perception or interpretation of any conflict issue in which he is engaged and not on any other. The second element meanwhile focused on one specific type of construction project - building projects in the Saudi Arabian public sector. These two elements were deemed necessary to develop a rich causal model for conflicts. It was not considered feasible to identify specific conflict variables for diverse construction environments, especially when considering the complexities of the procurement system associated with each type of construction project.

Another key concern throughout the research was that the PM strategies data collected during the investigation survey should not reflect the researcher's opinion, and nor should it reflect the personal standpoint of any single person or party connected to any project. For this reason, all the data collected regarding these strategies have been tested to ascertain and analyse the level of agreement from the perspective of all key parties in the industry. This was achieved by refining all data obtained first in terms of the form of the initial questions and then by placing them in the separate form of a structured questionnaire survey. The questionnaire designed for this survey was distributed randomly in three ways: sending emails to construction practitioners using an email grouping facility within a key official office body; sending faxes to construction organisation companies; and delivering questionnaires by hand.

10.3 Conclusion

This section contains the conclusions that have been drawn in respect of each objective, incorporating the most important achievements of this research project:

> Objective 1: To identify the inherent causes of conflict inherent within large architectural building projects in Saudi Arabia, and why they exist.

The results of the interview exercise with the participants working as client representatives, design consultants, main contractors, and sub-contractors involved in Saudi Arabian building projects revealed the sources of the design changes. There are:

Project Briefing;

Early Cost Estimation;

Site Selection and Acquisition;

Site Investigation;

Architect Selection;

Utilities Service;

Design team: Communication and Co-ordination;

Design Faults;

Design Change;

Ambiguities and Discrepancies;

Design Delay;

Tender Cost Estimation;

Tendering Process;

Selecting a Construction Team;

Contract Provisions;

Lack of Communication and Co-ordination;

Contract Management;

Unforeseen Ground Conditions;

Performance and Workmanship;

Utilities Service Connection;

Construction Material;

Procurement;

Change in the Construction Phase;

Delay in Project Progress or Handover;

Payment;

Commissioning and Completion Process;

The Client’s Non-compliance;

Bid Rigging;

Classification System; and

Dispute Resolution.

All of these causes of conflict have been explored, analysed and thoroughly discussed in Chapter Five.

> Objective 2: To test the validity of the research data used to identify the causes of conflict.

The results from the Validation Survey were supportive, providing further confirmation that the conflict causes identified were appropriately formulated, and hence, that the researcher's interpretation of these data was valid. The final result was very satisfactory as it represents 85% of the validation data. This was discussed and presented in Chapter Six.

> Objective 3: To explore the 'conflict associations' between the latent conditions of conflict and the actual issues of conflict.

Unlike many other examples of published literature in this field of research, an analysis of conflict causes was conducted in which the underlying conditions of conflict and the actual issue of conflict were differentiated. Observations of these latent conditions of conflict showed them to be insignificant in terms of encouraging the actual incidence of conflict, but that they served to encourage the possibility of conflict. In addition, it has been confirmed that the determination of the inter-relationship between latent conditions of conflict and the actual reason for conflict is a key element required to achieve proper understanding and explanation of how conflict between project parties occurs. Through this type of analysis, a summary has been provided of all the identified conflict causes, and this has been presented and discussed in Chapter Five, thereby producing a comprehensive report that help to map out the dynamics of conflict within the Saudi Arabian building projects industry. All of these inter-relationships between the antecedents of conflict and the actual conflict issues are established and drawn up in Chapter Seven called as a conceptual model of conflict causes. Fishers Exact Test shows some of these inter-relationships statistically recognised as significant associations which are expressed in the research as 'conflict associations' and these are :

- Conflict due to delay of project commencement or progress during the construction phase was associated with the latent condition of conflict attributable to lateness in selecting and gaining ownership of a proper project site in the pre-design phase.
- Conflict due to unexpected ground conditions or foundation problems during the construction phase was associated with the latent condition of conflict attributable to problems arising from the soil investigation and geotechnical report conducted in the pre-design phase.
- Conflict resulting from the demand for the project owner to pay additional compensation to the architect agent/firm was associated with the latent condition of conflict attributable to design change(s) ordered by the project owner in the design development phase.
- Conflict due to the kind of materials specifications to be supplied or used in the construction phase to meet the building design was associated with the latent condition of conflict attributable to discrepancies or inconsistencies between the bill of quantities document and design drawings which were created during the pre-construction phase.
- Conflict due to emerging new requirements of construction materials/components during the construction phase which were not originally in the bill of quantities document was a second type of conflict caused by discrepancies or inconsistencies between the bill of quantities document and design drawings.

Objective 4: To identify project management strategies for preventing or reducing the incidence and impact of conflicts.

Certain management strategies which were developed during the process of conducting this research have been tested and, therefore, may be suggested as useful for preventing or managing the harmful impact of conflict causes also identified in this research. However, it should be noted that there are other causes of conflict pointed out in this research that remain unaddressed and which perhaps need further exploration. It can be asserted that some of these causes of conflict are inherent or originating from the national or local culture and system, through the implementation of procedures, processes, laws, etc. For this reason, national construction industry reforms are needed in respect of strategic project management actions that can be effective in preventing or at least reducing the incidence of conflicts related to building projects in Saudi Arabia.

The desired strategies resulting from such reform have been presented and discussed in detail in Chapter Eight, and are briefly outlined as follows:

- Good Project Briefing Exercise;
- Accurate Early Cost Estimation;
- Early Selection and Acquisition of Project Site;
- Contract Provisions for Unforeseen Sub-surface Conditions;
- Qualifications Based Selection for Architect Selection;
- Adequate Utilities Service Data and Information ;
- Meetings with Construction team at Design Development Stage;
- Additional Service Fees for Design Change Orders;
- Saudi Common Construction Law for Ambiguities and Discrepancies;
- Realistic and Adequate Time Frame for Developing Design Documents;
- Pre-qualification Process within the Tendering Process;
- Improve Public Work Contract (PWC);
- Meetings with Design Team at Construction Phase;
- Deployment of Contract Management;
- Good Level of Construction Team Performance and Workmanship;
- Early liaison with Utilities Service Local authorities and Companies;
- Purchase or Supply Orders should be in Writing;
- Keeping Receipts and Records;
- Clear Method of Payment;
- Fairly Conduction of Commissioning and Completion Process;
- Modification to Contractors' Classification System; and
- Using Alternative Dispute Resolution Tools.

> Objective 5: To explore the extent to which such project management strategies could be implemented within the Saudi Arabian construction industry to manage harmful conflict

In Chapter Eight the project management (PM) strategy data was used to produce project management strategies aimed at preventing and/minimising conflict, and these strategies were discussed in detail. The overall results from the Recommendations Test Survey (RTS) showed that all the thirty-one proposed suggestions were significant and therefore, valuable. The overall average response was 3.51 which can be interpreted in terms of level of agreement using the Weighted Mean test, as falling mid-way between ‘Agree’ and ‘Strongly agree’. However, the SPSS software, and particularly Fishers Exact Test which was used to test whether there were any significant differences or attitudes between the respondent groups (clients/client representatives, design consultants, contractors, sub-contractors and ‘others’) toward each recommendation, indicated that there are statistically significant differences of opinion between these research samples in respect of four recommendations. These are *Recomm 1, Recomm 3, Recomm 5* and *Recomm 19*.

> Objective 6: To develop a generic industry framework providing project managers with a mechanism to identify further conflict, prevent and or control it.

This framework was developed in Chapter Nine. It was designed to help those professionals or project managers participating in building projects, whether at individual, group or organisational level, who are interested in obtaining further information regarding project management strategies that can be applied in order to avoid potential conflicts, and minimise that that do materialise. The framework is designed according to a ‘feedback’ principle along the lines that any knowledge which can be obtained from experience and past construction projects or processes should be employed to improve similar construction projects or processes in the present or future. The framework proposes that in the first instance, information about known conflict events should be generated by capitalising upon project participants past experience. From this starting point, direction as to how these various conflict events can be strategically avoided or reduced through effective project management in current and future projects can be gained.

10.4 Research Recommendations

The results of this study concluded that there are many issues/areas within building projects in Saudi Arabia that are prone to conflict. These issues arise from various sources which might appear at any phase of the project life, having been provoked by improper project management and/or regulative and administrative issues concerning national processes, procedures, systems, regulations and contracts currently practised or taken into consideration. In addition, the study has provided confirmation of the assertion by several authors cited in Chapter One, that conflict in construction projects is inevitable. Consequently, it is important to recognise that project managers need to be proactive in searching out potential areas of conflict and having several strategies ready for use should any of those potentials start to become realities. Such strategies should be borne out of previous experience. Additionally, the relevant national authorities or organisations should assist by launching initiatives that reduce the antecedents of conflict wherever possible, otherwise these latent issues may cause problems in the project processes, procedures, systems, regulations, and contracts and other aspects, consequently sustaining the level of conflict currently evident. The study has established a way of analyzing conflict and reviewing strategy, and has developed a number of project management strategies to deal with certain conflict issues inherent within building projects in Saudi Arabia. All of these strategies, which are highlighted in Section 8.6 in Chapter Eight, are recommended for implementation. Moreover, further research work should be to explore other latent conditions of conflict and actual conflict issues in order to establish more ideas about strategic project management that is able to adequately identify the antecedents of conflict and take steps to eradicate or weaken them.

10.5 Specific contribution to knowledge achieved

The contribution to knowledge made by this study is as follows:

- It has added to existing theory relating to the identification of the causes of conflict inherent within large architectural building projects in Saudi Arabian.

- It has added to existing theory relating to how these causes of conflict arise by describing and revealing the inter-relationships between two types of conflict variables or causes, namely, between latent conditions and actual conflict.
- It has suggested several project management strategies that can be implemented to prevent or reduce the potential incidence of conflicts within the Saudi Arabian building projects industry.
- It has developed an industry framework to generate information about conflict events and project management strategies so that a continual learning process and more cumulative knowledge can be established, and project managers' potential to predict conflicts and to deal with those that do arise, can be improved.

10.6 Research Limitations

There are several limitations to the research, as outlined below:

- Although the semi-structured interview survey was conducted in the main data collection phase, using a qualitative approach, the first limitation was the time allocated to the interviews, which was limited in order to enable more widespread analyses to be conducted to uncover as many conflict variables occurring within the public sector in large Saudi Arabian architectural building projects, as possible. However, it should be noted that, using non-deductive research methods, it is actually difficult to make concrete generalisations about the results obtained in terms of the entire industry. Nevertheless, the results secured from this analysis can be considered as indicative general patterns or trends. Further research, in the form of a follow-up survey, investigating additional conflict variables (but within standardised formal methods) and with large representative samples would probably provide more evidence of conflict variables and would be of further help in supporting the generalisations already made. Thus, to reiterate, it is probable that the limited time allocated to the interviews may have inhibited more in-depth analysis of and discussion about conflict causes and variables identified in this research project and, therefore, this may have imposed research limitations.

- In the main data collection survey, because of time constraints, the researcher chose to conduct 30 interviews to investigate more conflict and PM strategy data. However, with a greater number of interviews, more conflict association relationships between the conflict variables might have been determined, and hence a more comprehensive understanding of conflict causes, as well as ideas for project management strategies within the context of Saudi Arabian building projects, would be gained.
- As stated in Chapter One, one of the main objectives of this study was to determine conflict causes inherent within Saudi Arabian public building projects and to develop a knowledge of the existing theory relating to *why* and *how* these conflicts arise. Focusing on this objective, may have inhibited more in-depth analysis and discussion about each conflict cause, and this may be a limitation.

10.7 Further Research

This research project is concerned mainly with identifying and discussing latent conditions of conflict and conflict issues, the dysfunctional nature of conflict, and the association between these. It has also provided a number of suggested management strategies which might help to avoid certain problems. However, it is felt that further investigations need to be conducted, specifically to produce more potential strategies for conflict avoidance, with useful follow-up exercises to test these. Further analysis in this research area will help to facilitate differentiation between the uncontrollable or unavoidable, and the controllable, conflict variables.

It may be possible to conduct a similar study in other specific types of construction projects, such as utility projects, highway construction projects, dam construction projects, and so on. Alternatively, a study could be produced giving details of a key conflict variable such as ‘variation orders’ or a cluster of conflict variables based on the present study, with further investigations of harmful effects on a single or several aspects of a project such as the project plan, financing and cash flow problems, or project delays in construction projects.

There appears to be a dearth of any published data emerging from research investigations into the cost of construction conflicts in Saudi Arabia. However, performing this kind of study and calculating the estimated cost of the waste arising from conflict and its consequences within the Saudi Arabian construction sector should be possible, albeit not easy to achieve. This is due to the lack of availability of existing data bases which could be used to collate the indirect costs of waste. However, attracting the *savoir-faire* of experts and relevant construction participants will help efforts to recognise the areas where these indirect costs exist and perhaps help to interpret such data.

References

Abdul-Kadir, M. and Price, A. (1995). Conceptual phase of construction projects. *International Journal of Project Management* 13 (6), 387-393.

Abrahamson, M.W. (1984). Risk management. *Int.Construction Law Rev* 1(3), 241–64.

AbuThnain, M. and Amsugair, A. (2002). The efficiency of the contactor's classification system in representing the actual level of construction contractors to perform the public projects. *The Saudi engineering conference-6th*. King Fahad University. 2003.

Acharya, N., Young, D. and Im, H. (2006). Conflicting factors in construction projects: Korean perspective. *Engineering, Construction and Architectural Management* 13 (6), 543-566.

AIBC. (1998). How to find, select and engage an architect [online].
Available from: http://www.aibc.ac/public/seeking_an_arch/selecting.html
[accessed May 2009]

Akintoye, A. (2000). Analysis of factors influencing project cost estimating practice.*Construction Management and Economics* 18, 77- 89.

Akintoye, A. and Fitzgerald, E. (2000). A survey of current cost estimating practices in the UK. *Construction Management and Economics* 18, 161-172.

Al Hamdalla, R. (1998). Problems and approaches to translation with special reference to Arabic. *Lang and Transl.*, 10, 23-38.

Aleroan, A. (2008). *A comparison study between public work contract and FIDIC contract*, Unpublished MSc. Thesis. School of Engineering, King Saud University.

Al-Abedien, Z.H. (1995). About the effect of delay penalty on the construction of projects and modification proposals. *Proceedings of the First Saudi Engineering Conference.* Jeddah. 14-19 May 1995.

Al-Ghafly, M.I. (1999). Delay in public utility projects in Saudi Arabia. *International Journal of Project Management* 17 (2), 101-106.

Al-Hammad, I. (2008). Bureaucracy and the non-updated public works contract increases projects cost. *Al-Jazirah Newspaper*, [online]
Available from: http://www.al-jazirah.com.sa/2008jaz/feb/9/ec5.htm
[accessed 02 May 2011].

Al-Rabiah, A.R.A. (2006). 45 % of court dispute cases in Shari'ah courts and The Board of Grievances (Diwan Al-Mathalem) are concerned with construction contracts. *Eqtisadiah Newspaper*, [online]
Available from: http://www.aleqt.com/2006/07/11/article_47691.html

[accessed June 2012].

Al-Reshed, K. (2002). *Defining the responsibilities of owner and contractor for differing site conditions in governmental project*. Unpublished MSc. Thesis. Faculty of Civil Engineering, King Saud University.

Al-Sedairy, S. T. (1999). A change management model for Saudi construction industry. *International Journal of Project Management* 19, 161-169.

Al-Sultan, A. S. (1989). Determination of construction contract duration for public projects in Saudi Arabia. MSc. King Fahd University of Petroleum and Minerals.

Al-Sultani, S. (2007). 60% of litigations in Shari'ah courts and The Board of Grievances (Diwan Al-Mathalem) have concerned disputes in construction or commercial contracts. *AlRiyadh Newspaper,* Dec 2009.

Amason, A., Thompson, K., Hochwarter, W. and Harrison, A. (1995). Conflict: an important dimension in successful management teams. Organizational Dynamics 24(2), 20-35.

Andersen, E.S. (2008). *Rethinking project management: An organisational perspective.* England: Pearson Education limited.

Arafh, M. (2008). Government tenders and procurement (GTP) system and the disputes of public work contract. *Al-eqtisadiah Newspaper (Saudi),* 18 January.

Arslan, G., Kivrak, S., Birgonul, M. and Dikmen, I. (2007). Improving sub-contractor selection process in construction projects: web-based sub-contractor evaluation system (WEBSES). *Automation in Construction* 17 (2008), 480–488.

Assaf, S. and Al-Hejji, S. (2005). Causes of delay in large construction projects. *International Journal of Project Management* 24 (2006), 349–357.

Ballard G. and Howell G. (1998). What kind of production is construction? P*roceedings of the Sixth Annual Conference of the International Group for Lean Construction*. Guaruja, Brazil. August 13th-15th 1998.

Balock, H. (1989). *Power and conflict: toward a general theory*. Newbury Park California: Sage.

Barker, J., Tjosvold, D. and Andrews, I.R. (1988). Conflict approaches of effective and ineffective project managers: a field study in a matrix organisation. *Journal of Management Studies 25*(2), 167-178.

Barki , Henri and Hartwick ,Jon (2001). Interpersonal conflict and its management in information system development. *MIS Quarterly* 25(2), 195-228.

Belak, T. (1998). Conflict between groups- sources-resolving intergroup conflicts. *Mediate.com* [online]

Available from: http://www.scribd.com/doc/61413820/Inter-Group-Conflict-in-the-Workplace [accessed 2008].

Bharat Book Bureau. (2009). *Saudi Arabia building construction industry report*, [online] Available from: http://www.bharatbook.com/market-research-reports/construction-market-research-report/saudi-arabia-building-construction-industry-overview.html [accessed 16 April 2012].

Blake, R. and Mouton, J. S. (1984). *Solving costly organizational conflict*. San Francisco: Jossey Bass Publishers.

Blake, R. and Mouton, J. (1964). *The managerial grid.* Houston, TX: Culf Publishing.

Bodley, J. (1994). *Cultural anthropology: tribes, states, and the global system* [online]. Available from: http://www.wsu.edu:8001/vcwsu/commons/topics/culture/culture-definitions/bodley-text. [accessed Dec 2008]

Brewer, G. (2007). *The risk of unforeseen ground conditions* [online]. Available from: http://www.brewerconsulting.co.uk/cases/CJ0709RR.htm [Accessed 27 March 2007]

Bristow, D. and Vasilopulos, R. (1995). The new CCDC 2: facilitating dispute resolution of construction projects. *Construction Law Journal*, 11 (2), 95-117.

Brooker, P. (2002). Construction lawyers' attitudes and experience with ADR. *Construction Law Journal*, 18(2), 97-116.

Bryman, A. (2001). *Social research methods.* Oxford: Oxford University Press.

Bryman and Becker, P. (2004). *Understanding research for social policy and practice*. UK: The Policy Press and Social Association.

Bubshait, A., Alsaid, F. and Abolnour, M. (1998). Design fee versus design deficiency. *Journal of Architectural Engineering* 4(2), 44-46.

Bubshait, A., Farooq, G., Jannadi, O. and Assaf, S. (1999). Quality practices in design organizations. *Construction Management and Economics*, 17, 799-809.

Callahan, M. (2005). Construction change order claims. 2^{nd} ed. USA: Aspen Publisher, Inc.

Carr, T. (1994). The strengths and weaknesses of quantitative and qualitative research: what method for nursing? *Journal of Advanced Nursing* 20(4), 716-721.

Casey, J. (1979). Identification and nature of risks in construction projects: a contractor's perspective. In: *Proceedings of the Construction Risk and Liability Sharing conference*. Scottsdale (USA).

CEC/D. (2000). How to select an engineer. *Consulting engineers council of Delaware* [online].Available from: http://www.cecde.org/ACEC-DE/select_engineer.htm [accessed May 2009]

CEC/PA. (2000).Selecting the right consulting engineer. *Consulting engineers council of Pennsylvania* [online] Available from: http://www.cecpa.org [accessed May 2009]

Chan, E., Yu, A., Chan, D., Lam, P. and Tang, P. (2010). Management of client requirements for design and build projects in the construction industry of Hong Kong. *Facilities* 28(13/14), 657-672.

Chartered Institute of Building. (1992). *Code of practice for project management for construction development*. 1st ed. Great Britain: Chartered Institute of Building.

Cheung, S-O. (1998). Critical factors affecting the use of alternative dispute resolution processes in construction. *International Journal of Project Management*, 17(3), 189-194.

Cheung, S-O., and Yiu, T. (2006). Are construction disputes inevitable? *IEEE Transactions on Engineering Management*, 53(3), 456-470.

Chinyio, E. (2010). *Construction stakeholder management*. UK: Blackwell Publishing Ltd.

CIB, The Chartered Institute of Building. (2002). *Code of practice for project management for construction and development.* 3rd ed. UK: Blackwell Publishing.

Ciraci, M. and Polat, D.A. (2009). Accuracy levels of early cost estimates, in light of the estimate aims. *Cost Engineering* 51(2) 16-24.

Cohen, E. (2007). *Information and beyond: part II*. California: Information Science Institute.

Crossan, F. (2003). Research philosophy: toward an understanding. *Nurse Research*, 11(1), 46-55.

Cowling, B. (2011). Procurement of infrastructure in Saudi Arabia: public work contract. *Clyde & Co* [online] Availablefrom:http://content.yudu.com/Library/A1rmmh/ABCCFortnightly Volum/resources/20.htm [accessed 20 April 2012].

Cox, A. and Thompson, I. (1998). *Contracting for business success*. London: Thomas Telford Publishing.

Cram, J. A. and Williams, R.K. (n.d.). *The cost of conflict in the workplace* [online]Available from: http://www.crambyriver.com/coc.html [accessed 06 Feb 2012]

Cronin, M.A. and Bezrukova, K. (2006). *Conflict, learning, and frustration: a dynamic model of conflict over time*. Montreal, Canada: International Association for Conflict Management.

Cronjé, J. (2006). Paradigms Regained: toward integrating objectivism and constructivism in instructional design and the learning sciences. *ETR & D*, 54(4), 387–416.

Dahlgren, J. and Søderlund, J. (2001). Managing inter-firm industrial projects: on pacing and matching hierarchies. *International Business Review* 10 (2001), 305–322.

Daoud, O. E. and Azzam, O. M. (1999). Sources of disputes in construction contracts in the Middle East. *Technology, Law and Insurance*. (4)1-2.

Davis, P., Love, P., London, K. and Tom, J. (2008). Causal modelling of construction disputes. *Twenty-fourth annual ARCOM conference*. Cardiff, UK. 1-3 September 2008.

De Bono, E. (1991). *Conflicts: a better way to resolve them.* London: Penguin Books.

Deutsch, M. (1990). Sixty years of conflict. *The International Journal of Conflict Management* 1, 237-263.

Deutsch, M. (2006). *The handbook of conflict resolution: theory and practice*. San Francisco: John Wiley and Sons Inc.

Doloi, H. (2009). Analysis of pre-qualification criteria in contractor selection and their impacts on project success. *Construction Management and Economics* 27, 1245–1263.

Donohue, W. and Kolt, R.(1992). *Managing interpersonal conflict*. Newbury Park, CA: Sage.

Drory, A. and Amos, I. (1997). Effects of work experience and opponent's power on conflict management style. The International Journal of Conflict Management 8(2) 148-161.

Easterbrook, S. *et al*. (1993). A Survey of Empirical Studies of Conflict. In S. M. Easterbrook, ed. *CSCW: Cooperation or Conflict?* London: Springer-Verlag.

Easterby-Smith, Thorpe, R. and Lowe, A. (2002). *Management research.* 1st ed. London: SAGE Publications Ltd.

Eisner, E. and Peshkin, A., eds. (1990). *Qualitative inquiry in education: the continuing debate*. New York: Teachers College Press.

Elvin, G. (2003). (Re) Integrated practice in architecture. New Jersey: John Wiley & Sons, Inc.

Emmitt, S. and Gorse, C. (2003). *Construction communication.* Oxford: Blackwell Publishing.

Eschman and Lee (1977).Conflict in civilian and air force program/project organizations: a comparative study. Master thesis. Air Force Institute of Technology (AU), Ohio, USA.

Fellows R. and Liu A. (2003). *Research methods for construction*.2nd Ed. Oxford: Blackwell Publishing.

Fenn, P. (2002). Why construction contracts go wrong (or an aetiological approach to construction disputes). *Society of Construction Law Meeting, Derbyshire*, 1-12.

Fenn, P., O'Shea, M. and Davies, E. (1998). *Dispute resolution and conflict management in Construction*. London: E & FN Spon.

Fenn, P., Lowe, D. and Speck, C. (1997). Conflict and dispute in construction. *Construction Management and Economics* 15, 513-518.

Filley, A. C. (1975). *Interpersonal conflict resolution*. Glenview, IL: Scott Foresman and Company.

Fisher, R. (2000). *The handbook of conflict resolution: theory and practice*. San Francisco: Jossey-Bass Publishers.

Frey, J. and Oishi, S. (1995). *How to conduct interviews by telephone and in person*. US: SAGE Publications, Inc.

Furnham, A. (1997). *The psychology of behaviour at work: the individual in the organization*. Sussex: Taylor and Francis.

Gebken, R. (2006). *Quantification of transactional dispute resolution costs for the U.S. construction industry*. PhD thesis University of Texas, USA

Gibbons, M. (2007). *Success at work: resolving disputes in the workplace*. UK: Department of Trade and Industry: 12.

Goldsmith, W. and Clutterbuck, D. (1984). *The winning streak*. London: Weidenfeld & Nicolson.

Gorse, C. and Emmitt, S. (2003). Investigating interpersonal communication during the construction progress meeting: challenging and opportunities. *Engineering, Construction and Architectural Management* 10(4), 234-244.

Gould, J. P. (1995). Geotechnology in dispute resolution. *Journal of Geotechnical Engineering* 121(7), 521-534.

Greenberg, J. (2003). *Organizational behavior: the state of the science.* New Jersey: Lawrence Erlbaum Associates, Inc.

Greenhalgh, T. (1997). How to read a paper: papers that go beyond numbers (qualitative research). *BMJ* 7110(315) [Online]
Available from: http://www.bmj.com/archive/7110/7110ed.htm, Education and debate. [accessed December 2009].

Grix, J. (2002). Introducing students to the generic terminology of social research. *Politics*, 22(3), 175–186.

Gronrros, C. (1984). *Strategic management and marketing in the Service Sector*. Helsinki: Swedish School of Economics and Business Administration.

GTP. (2007). Government tenders and procurements law. Saudi Arabia: Royal Decree NO.85M date 04/09/1427H.

Hakim, C. (1987). *Research design: strategies and choices in the design of social research. Contemporary Social Research Series (13).* London, UK: Allen and Unwin.

Hatem, D.J. (1998). *Subsurface conditions: risk management for design and construction management professionals*. Canada: John Wiley and Sons, Inc.

Hellriegel, D. and Slocum, J. W. (1986). *Organizational behavior*, 4th edition. St. Paul : West, c1986.

Hellriegel, D. and Slocum, J. W. (2006). *Organizational behavior*, 11th edition. Canada: South-Western.

Hewitt, J. (1991). *Winning construction disputes: strategic planning for major litigation*. London: Ernst & Young.

Hofstede, G. (1980). *Culture's consequences: international differences in work-related values.* Beverly Hills, California: Sage.

Hsieh, T., Lu, S., Wu, C. (2004). Statistical analysis of causes for change orders in metropolitan public works. *International Journal of Project Management*, 22(8):679–86.

Ibbs, C.W. (1997).Quantitative impacts of project change: size issue. *J Constr Eng Manage*., 123(3), 308–11.

Ibn-Homaid, N. (2005). An evaluation of the Saudi contract for public works. *Journal of King Saud University: Engineering Sciences*.18 (2),16-19.

Jannadia M.A.S., Bubshait, A. and Naji, A. (2000). Contractual methods for dispute avoidance and resolution (DAR). *International Journal of Project Management* 18, 41-49.

Jex, S. M. and Britt, T. W. (2008). *Organizational psychology: A scientist-practitioner Approach*. New York: John Wiley and Sons Inc.

Johnson, B. R. (1997). Examining the validity structure of qualitative research. *Education* 118(3), 282-292.

Johnson, G., Langley A., Melin, L. and Whittington, R. (2007). *Strategy as practice: research directions and resources*. Cambridge: Cambridge University Press.

Jones, S. R. (1994). How constructive is construction law? *Construction Law Journal* 10 (1), 28-38.

Kellogg, J., Howell, G. and Taylor, D. (1981). Hierarchy model of construction productivity. *J ASCE Construction Division*, 107, 137-152.

Kennedy, P. (2006). Progress of statutory adjudication as a means of resolving disputes in construction in the United Kingdom. Journal of Professional Issues in Engineering Education and Practice. Vol. 132, (3), 236-247.

Kerzner, H. (1984). Project management: a systems approach to planning, scheduling and controlling. 2nd Ed. New York: Van Nostrand Reinhold.

Kezsbom, D., Schilling, D. and Edward, K .(1989). *Dynamic project management: a practical guide for managers and engineers*. New York: John Wiley and Sons Inc.

Kotler, P., Armstrong, G., Wong, V. and Saunders, J. (2008). Principles of Marketing. 5th ed. Harlow: Financial Times Prentice Hall.

Kumarawamy, M. (1996). Consequences of construction conflict: A Hong Kong perspective. *Journal of Management in Engineering* 14 (3), 66–74.

Kumarawamy, M. (1997). Common categories and causes of construction claims. *Construction Law Journal*, (13)1, 21-34.

Kuesel, T.R. (1979), 'Allocation of Risks', Construction Risk and Liability Sharing Conference Scottsdale, American Society of Civil Engineers, Scottsdale, USA.

Kwakye**,** A. A. **(**1994**).** *Understanding tendering and estimating*. London: Gower.

Lam, K., Wang, D., Lee, P.and Tsang, Y. (2007). Modelling risk allocation decisions in construction contracts. *International Journal of Project Management* 25 (5), 485–493.

Latham, M. (1993). *Constructing the team*. London: HMSO.

Law, C. (1994). Building contractor estimating: British style. *Cost Engineering* 36(6), 23- 8.

Lawrence, P. R. and Lorsch, J. W. (1986). *Organization and environment: managing differentiation and integration*. Boston: Harvard Business School Press.

Lorenz, V. C. (1989). Some treatment approaches for family members who jeopardize the compulsive gambler's recovery. *Journal of Gambling Behavior* 5, 303-312.

March, J. and Simon, H. (1958). *Organisation*. New York: Wiley.

Medina J. F., Munduate, L. M., Dorado, A. Martínez, I., Guerra, M. J. (2005). Types of intragroup conflict and affective reactions. *Journal of Managerial Psychology* 20(3/4), 219-230.

Miles, M. B. and Huberman, A. M. (1984). *Qualitative data analysis: a sourcebook of new methods.* Beverly Hills, CA: Sage.

Ministry of Economy and Planning, Saudi Arabia. 2008. *The statistical year book*: *statistical indicator*. Riyadh: CDS.

Mitropoulos, P. and Howell, G. (2001). Model for understanding, preventing, and resolving project disputes. *ASCE Journal of Construction Engineering and Management* 127(3), 223-221.

Mohammed, R. E. (2007). *An exploratory system dynamics model to investigate the relationships between errors that occur in construction documents in Saudi Arabia and their possible causes*. Unpublished Ph.D. Faculty of Engineering, School of Built Environment, Heriot Watt University.

Morris, M.W., Williams, K.Y., Leung, K., Larrick, R., Mendoza, M.T., Bhatnagar, D., Li, J., Kondo, M., Luo, J-L. and Hu, J-C. (1998). Conflict management style: Accounting for cross-national differences. *Journal of International Business Studies* 29(4), 729-747.

Mullins, L.J. (1989). *Management and organisational behaviour.* 2nd ed. London: Pitman Publishing.

Nachmias**,** C. and Nachmias**,** D. (1996). *Research methods in the social sciences***.** London**:** Arnold**.**

Newcombe, R. (1996). Empowering the construction project team. *Int. J. Project Manage.* 14(2) 75–8.

Newman, W. B. (2002). Workplace conflict not inevitable [online]. Available from:http://www.bizjournals.com/albany/stories/2002/09/30/focus7.html?page=all [accessed December 2008].

Ntiyakunze, S. K. (2011). Conflicts in building projects in Tanzania: analysis of causes and management approaches. Doctoral thesis. Royal Institute of Technology (KTH), Stockholm, Sweden.

Office of Government Commerce (OGC). (2002). *Contract Management Guidelines: principles for service contracts*. The UK Office of Government Commerce. Norwich. Available from: http://www.ogc.gov.uk/documents/Contract_Management.pdf

Pena-Mora, F., Sosa, C. E. and McCone, D. S. (2003). *Introduction to construction dispute Resolution*. New Jersey: Prentice Hall.

Project Management Institute (PMI). (2000). A guide to the project management body of knowledge (PMBOK® Guide). 2nd ed. Newtown Square, PA: Project.

Posner, B.Z. (1986), What's all the fighting about? Conflicts in project management. *IEEE Transactions on Engineering Management*, Vol. 33 (4), 207-211.

Pondy, L. R. (1967). Organizational conflict: concepts and models. *Administrative Science Quarterly* 12(2), 296-320 .

Punch, K.F. (1998). Introduction to social research: qualitative and quantitative approaches. London: Sage

Putnam, L. L. and Poole, M. S. (1987). Conflict and Negotiation. In F.M. Jablin, K.H.

Rahim, F. (1992). Managing conflict in organizations. In: P. Fenn and R. Gameson, eds. *Conflict management and resolution*. London: E & FN Spon. 369-377.

Rahim, M. A. (2002). Toward a theory of managing organizational conflict. *International Journal of Conflict Management* 13(3), 206 – 235.

Rahim, M. A. (2011). *Managing conflict in organizations.* 4th ed. New Jersey: Transaction Publisher.

Rahim, M. A. and Bonoma, T. V. (1979). Managing organizational conflict: a model for diagnosis and intervention. *Psychol. Rep*. 44, 1323–1344.

Roberts, K. and Porter, L. W. eds. (1987). *Handbook of organizational communication: an interdisciplinary perspective.* Newbury Park California: Sage.

Rogers, T. F. (1976). Interviews by telephone and in person: Quality of responses and field performance. *Public Opinion Quarterly*, (40), 51-65.

Royal Command. (2007). *Tender and procurement competition law*, (Cmnd. 58). Saudi Arabia.

Saudi Arbitration Law 1403 (equivalent to 25 April 1983). (Royal Decree M/46). Saudi Arabia: Council of Ministers.

Saunders, M. N. K., Lewis, P. and Thornhill, A. (2007). Research methods for business students. 4th ed. Essex: Pearson Education Limited.

Saveur, J. (2003). *(Re) Claiming the underground space*. Netherlands: Swets & Zeitlinger.

Schermerhorn, J. R. (2010). *Exploring management.* New York: John Wiley and Sons Inc.

Schmidt, S. and Kockan, T. (1972). Conflict towards conceptual clarity. *Administrative Science Quarterly* 17 (3), 359-370.

Schutt, R. K. (2006). *Investigating the social world: the process and practice of research*. US: SAGE Publications Inc.

Seidman, I. (2006). *Interviewing as qualitative research: a guide for researchers in education and the social sciences*. New York: Teacher College Press.

Sell, M. V., Brief, A. P. and Schuler. R. S. (1981). Role conflict and role ambiguity: integration of the literature and directions for future research. *Human Relations* 34(1), 43-71.

Semple, C., Hartman, F. T. and Jergeas, G. (1994). Construction claims and disputes: causes and cost/time overruns. *Journal of Construction Engineering and Management* 120(4) 785-795.

Shoult, A. (2006). *Doing business with Saudi Arabia.* London: GMB Publishing Ltd.

Skitmore *et al.* (2001). Multi-criteria evaluation model for the selection of architectural consultants. *Construction Management and Economics* 20, 569-580.

Smith, Mark J. (1998). Social science in question. 1st Ed. London: SAGE Publications Ltd.

Steen, J. (1994). Five steps to resolving construction disputes – without litigation. *ASCE Journal of Management in Engineering*, 10(4), 19-21.

Sun, M. and Meng, X. (2008). Taxonomy for change: causes and effects in construction projects. *International Journal of Project Management* 27 (6) 560–572.

Sykes, J. (1996). Claims and disputes in construction: suggestions for their timely resolution. *Construction Law Journal*, 12(1), 3-13.

Szilagyi, A., Wallace, M. (1987). Organizational behavior and performance. 5th ed. USA: Scott Foresman Company.

Thamhain, H.J., & Wdemon, D. L. (1975). Conflict management in project life cycles. *Sloan Management Review, 16*, 3 1—50.

The Business Review. (2002). *Workplace conflict not inevitable* [online]. Available from: http://www.bizjournals.com/albany/stories/2002/09/30/focus7.html?page=all [accessed: December, 2008].

The National Audit Office (2001), Modernising Construction. London: HMSO.

Thomsa, K. W. (1976). Conflict and conflict management. In M. D. Dunnete, Ed. Handbook of industrial and organizational psychology. Palo Alto, California; Consulting Psychology Press. 889-935.

Thompson, J. (1967). *Organisations in action*. New York: McGraw-Hill.

Thompson, P. and Perry, J. (1992). *Engineering construction risks: a guide to project risk analysis and risk management*. London: Thomas Telford Ltd.

Tilley, P., McFallan, S. and Tucker, S. (2000). Design and documentation quality and its impact on the construction process. *American Institute of Steel Construction* 34(4), 7-14.

Totterdill, B. W. (1991). Does the construction industry need alternative dispute resolution? The opinion of an engineer. *Construction Law Journal* 7(3), 189-199.

Totterdill, B. W. (1997) Dispute Avoidance. In: P. Campbell, ed. *Construction dispute: avoidance and resolution*. Caithness: Wittles Publishing. 25-26.

Treacy, T. (1995). Use of alternative dispute resolution in the construction industry. *ASCE Journal of Management in Engineering* 11(1), 58-63.

Trost, S. M. and Oberlender, G. D. (2003). Predicting accuracy of early cost estimates using factor analysis and multivariate regression. *ASCE* 129(2), 198-203.

Uher, T. and Davenport, P. (2009). *Fundamentals of building contract management.* 2nd ed. Sydney: University of New South Wales.

Vaaland, T. and Håkansson, H. (2003). Exploring interorganizational conflict in complex projects. *Industrial Marketing Management* 32(2) 127-138.

Verma, V. K. (1996). *The human aspects of project management vol. two: human resource skills for the project manager*. USA: PMI Publishing Department.

Verma V. K. (1998). *Project management handbook*. USA: The Project Management Institute.

Vorster, M.C., (1993). *Dispute prevention and resolution.*USA: Virginia Polytechnic Institute & State University.

Wall, J.A., Callister, R. R. (1995). Conflict and its management. *Journal of Management* 21(3), 515-558.

Walliman, N. (2005). Your research project: a step-by-step guide for the first-time researcher. 2nd Ed. California: Sage Publications.

Walton, R. E. and Dutton, J. M. (1969). The management of interdepartmental conflict: a model and review. *Administrative Science Quarterly* 21 73-84.

Wang, S. and Anumba, C. (2008). A survey on communications in large-scale construction projects in China. *Engineering, Construction and Architectural Management* 16(2) 136-149.

Watts, V. and Scrivener, J. (1995). Building disputes settled by litigation: comparison of Australian and UK practices. *Building Research and Information* 23(1), 31-38.

Weddikkara, C. (2003). The impact of professional culture on dispute resolution in the building industries of Australia and Sri-Lanka. Doctoral Thesis. Murdoch University, Perth, Western Australia.

Willmott, H., Daft, R.L. and Murphy, J. (2010). *Organization theory and design*. South-Western: Canada.

Wong, C., Holt, G. and Harris, P. (2001). Multi-criteria selection or lowest price? Investigation of UK construction clients' tender evaluation preferences. *Engineering, Construction and Architectural Management* 8(4), 257-271.

Wu, C., Hsieh, T. and Cheng, W. (2005). Statistical analysis of causes for design change in highway construction in Taiwan. *International Journal of Project Management* 23 (7), 554–563.

Yiu, T. W. and Cheung, S. O. (2006). Are construction disputes inevitable? IEEE Transactions on Engineering Management 53(3), pp.456-470.

Yin, R. (2003). *Case Study Research, Design and Methods*, 3rd ed. London: Sage Publications.

Yu, A., Shen, Q., Kelly, J. and Hunter, K. (2008). Comparative study of the variables in construction project briefing/architectural programming. *J. Constr. Eng. Manage*. 134(2), 122–138.

Appendix A

Section 1: Contractual Responsibilities as Related to Saudi Arabian Construction Industry:

Project Owner /Client Representative

The project owner or client representative in public sector building projects is a person, team or unit usually appointed by a government entity or body when a project needs to be built. Once the final decision is made on what and when to build, the next step is to proceed to the central authority (Ministry of Finance) which acts as the client's authorised representative by being the experienced 'eyes and ears' of the public body it represents in order to make each service provider accountable for his commitments and contractual responsibilities. During the pre-construction and construction phases the Client Representative usually employs a number of consultants to produce designs, estimate costs and supervise the work, and employs a contractor to undertake the work. The representative also engages with other services germane to project activities including site selection, management methods for designing and contracting, procurement systems, project inspection and other aspects of the process performed in-house to finally determine and implement exactly what needs to be done for the benefit of the project owner(the public entity or body).

The Consultant (Supervising Engineer)

Consultants to public sector building projects are expert agents who have experience and knowledge of the construction field. Usually, they are appointed by government entities and bodies to employ their technical knowledge and services to help them to implement their project plans and designs. Generally, the scope of the work undertaken by a consultant mainly includes supervision and a follow-up role appertaining to the ongoing construction process carried out by the contractor, and making sure that all the set contracting requirements are fulfilled. These roles may include, for instance, step-by-step checking, monitoring and reporting upon a project in terms of performance and output, ensuring quality control standards, and the participation of the contracting parties as they go through a variety of internal procedures. However, as there are differences in areas of expertise in terms of the various disciplines required to provide proper supervision and management, specialist consultants might be employed to focus on respective areas of expertise which are needed to run this kind of construction work.

The Main Contractor

The contractor is a member of the construction team of the project, and is responsible for carrying out the actual work of the entire construction activities (or the majority of them) in accordance with the design. In fact, s/he is fully responsible, according to the standard form of the Public Work Contract (PWC), to perform this work within the required quality, time allowed and agreed price as stipulated in the contract and its attached documents (e.g. bill of quantity). Other responsibilities can also be included such as monitoring the health and safety of the workforce and public, protection of the environment and minimising disruption.

Contractors can either be small local or large multinational firms. However, irrespective of size, the contractor deals with a number of national organisations which may be involved as part of the construction team, and co-operates with them to ensure the project requirements can be fulfilled. This team mostly includes: the client representative(s), the design consultants, the local council, gas, electricity, and other utilities, the Environmental Agency, and other companies. In addition, depending on the project's complexity, the contractors may also employ large numbers of different professions and service providers for the team as specialist sub-contractors and suppliers. This means that they may be employed to perform and supply some parts of the project work which perhaps requires specific expertise capability such as electrical, plumbing and air conditioning work. Nevertheless, as far as the PWC is concerned, contractors are not entitled to make any contractual agreement with sub-contractors to carry out all or any part of the construction work without obtaining prior written consent by the relevant client representative (Article 4).

The Sub-contractor

The subcontractor is an individual or sometimes a services company which is hired by a main contractor to perform all or part of a specific task on or for a complicated building or structure. Main contractors prefer to use sub-contractors because they lack sufficient resources or expertise in a specific area that needs to be completed. They are employed to do all kinds of jobs such as reinforced concrete work, foundation piling, roofing, structural steelwork, cladding, electrical work and plumbing. However, in Saudi Arabia, most public projects take on two forms of sub-contracting, via:

(i) Domestic sub-contracting: here, the main contractor is contractually engaged with a sub-contractor who is fully under his control while the project owner has no direct contractual relationship.

(ii) Nominated sub-contracting: here, the sub-contractor is usually nominated directly by either the project owner or through his consultant working under the main contractor's contract and his supervision.

In fact, in both cases the main contractors and the client's consultants are required by law, before involving themselves in any contractual agreement with sub-contractors, to obtain prior permission in writing (See Saudi Arabian Pubic Word Contract form of contract, Article 4 and Consultancy Engineering Services (Supervision) form of contract, Article 5).

Section 2: Construction Project Phases as Related to the Saudi Arabian Construction Industry:

Pre-design Phase

Pre-design is the phase that usually involves several members of the building design team such as the architect, owners, and related parties to discuss the purpose and functionality of the building from the design viewpoint. As far as Saudi Arabian public project law is concerned, this exercise cannot begin until official permission has been given by the relevant authority for the project to proceed. Before a detailed design is created, basic undertakings such as data gathering, design briefing, site selection and acquisition, scheme design and final project costing in keeping with the budget, are discussed and analysed. In fact, the amount of funding at this stage is variable and subjective, and early cost estimation is sometimes a critical factor for a pre-design team in determining the final design for the construction of the building. Indeed, the preliminary design is perhaps one of the most important outcomes of this phase as it can be the means of bridging the gap between the original design concept and the finalised design which emerges in the next phase.

Pre-construction Phase

At this second stage of the building project process, clients are expected, as a follow-up to the previous stage, to complete the project briefing exercise with the project team, agree on design solutions, approve the scheme design and make a commitment to project funding. In fact this stage involves and covers all other activities including developing the design detail and preparing the tender documents for the tendering process up to the point when the main contractor is appointed to perform the construction work. These documents typically contain all the essential details of the design associated with the specifications and the bill of quantity for each building component.

In fact, all of these preparation and development activities cannot usually be carried out until the final approval for the funding of the project is obtained from and determined by the authorised person or body. In addition, with regard to the amount of funding proposed by the project owner and his consultant as found in the approved tender documents, it cannot be finally determined and set until competitive bidding takes place. This is when contractors submit their bids with their cost estimation proposal for the project and one of them is then selected based on the concept of 'lowest price wins' as stipulated by the GTP law on public contracts. Therefore, by the end of this pre-construction stage, the design detail, appointment of contractor and final cost estimation of the project for the construction of the building are conclusively affirmed so that the signal to 'go ahead' can be given.

Construction Phase

Once the order to proceed is received, the project team (i.e. essentially, the main contractor) translates the design into construction planning and physical structures. The contractor is the main player at this stage and has many responsibilities and duties in terms of communicating with and co-ordinating the other members of the project team and actualising the project specifications and design appropriately. The design team who are clearly more involved with the design information, may also have a duty to help contractors by giving advice to ensure that work is done in accordance with the design. However, during the construction process, late design changes (often called 'variation orders') may suddenly be made without warning, which can sometimes be a key issue. Any adjustments and/or improvements to the project elements can still be made before the commissioning and operational completion process is put in place.

Commissioning and Completion Phase

This is the final stage of the project. At this point the relevant project team personnel (e.g. the client representatives) will signal their acceptance and perform the handover checking procedure to ensure that the project has been properly planned and executed before the practical completion takes place. According to the PWC, as soon as the main contractors notify the relevant team project personnel of the project handover, the project owner is asked to set a maintenance period called ‘initial acceptance’ to undertake an examination procedure to ascertain the state of all elements of the building including the engineering installations. If any defects or uncompleted work are found by the project owner during this period, the contractor is held responsible for them and he can be given further time as appropriate to rectify them at his own cost. Ultimately, as soon as all of the deficiencies are eradicated by the contractor, final acceptance takes place and final payment to cover all of the contractor’s work is released.

Appendix B

THE MAIN INVESTIGATORY SURVEY GUIDANCE OF SEMI-STRUCTURED INTERVIEW QUESTIONS

Brief outline of research objectives

To identify and analyse the latent conditions, the causes of conflict in Saudi Arabian building projects and to determine the relationship between them; to identify project management strategy to be avoided or at least minimised. In other words, to discover the theoretical background to them which would probably help to explore new or modified project management practice in order to enhance the possibility of a positive outcome to a conflict and limit the damage caused by dysfunctional conflict.

Date: interview **#:** interviewee Code:

Section (1): Specific information about the interviewee:

1. Your name is:

____

2. Title of position held: ____________________________________

3. What is the name of your company/organisation?

____

4. What is your telephone number and email address?

Telephone ( ) email ( )

5. In how many project (s) have you been involved in Saudi Arabia in the last three years?

Section (2): Specific project information required

6. Please recall and describe any medium or large public building project in which you were involved in the last five years.

7. Describe your company's role in this project as follows:

Client representative [ ] Consultant [ ] Contractor [ ] Subcontractor [ ]

8. What was the tendering selection method used and the contract type conditions adopted in this project and with whom?

9. Please tell me which phase(s) listed below in Table 1 you were involved in during the project management process of this project? (Circle one number 1, 2 or 3 as applicable in each row).

Table 1 : Level of involvement	full involvement	Some Involvement	No Involvement
Pre-design phase: including feasibility and strategy stages, site selection and investigation, design brief, estimating budget and time-scale, selecting a designer.	1	2	3
Pre-construction phase: including design development, builder listing and selection, proposal documents perpetration, submittal and evaluation (bidding), tender action and contract award.	1	2	3
Construction phase: all construction activities and management including procurement of materials, progress payments, approving variations and organising the inspections, etc. and handover.	1	2	3
Commissioning and completion :(including testing and commissioning process **)**	1	2	3

10. What was the estimated contractual and the actual total cost of this project?

11. What were the agreed start and finish dates of this project and what were they in reality?

Section (3): Area for exploration and discussion

12. Please recall instances of conflicts and disputes (including disagreements), however small or insignificant they may seem, whether they happened to you or to the other project parties in this building project.

13. *Conflict* describes a process or occasion that begins whenever an individual or group makes him or them feel negatively affected by another individual or group. Please can you describe any conflict cause(s) within this particular project?

14. *A latent condition of conflict* describes an antecedent or underlying conditions (situations) that may lead to conflict in the future and which may or may not reach the attention of at least one of the members of the project group. With this in mind, would you please describe any latent condition (s) you can think of which may have encouraged this conflict which you have just described?

15. From your point of view, do you consider this conflict to be functional or dysfunctional? In other words, did this conflict provide you with a positive outcome (s) or value or did it have a harmful impact?

16. In terms of conflict level, can you describe the nature of the disagreeing party in the situation in terms of relationship, emotions and behaviour?

17. What would be your suggestion(s) for project management strategy, if you were about to start an identical project, to prevent or minimize the harmful impact of such a conflict?

Appendix C

The University of Manchester

MANCHESTER 1824

VALIDATION SURVEY QUESTIONNAIRE

Project name: ___________________________________ **PO #____**

Introduction

This survey questionnaire is part of a second investigation to validate the findings of an earlier investigation (by way of interviews) which was carried out concerning the latent condition, i.e. causes of conflict between project parties in Saudi Arabian building projects. I would be very grateful if you could spare some of your valuable time to look at the relevant questions below and return them answered **within two weeks.**

مقدمة :

هذا الإستبيان هو جزء أخر ومكمل للداسة التي تم أجراءها سابقا وهو في الحقيقة يهدف إلى التحقق من البيانات التي جمعت خلال تلك المقابلة بهدف أختيار موثوقية تلك البيانات والتي كان تدور حول أستكشاف وتحليل جزور وأسباب النزاعات بين أطراف المشروع في مشاريع المباني في السعودية . وأستكمالاً لمتطلبات هذة الدراسة فإرجوا منكم الاستقطاع من وقتكم الثمين بلاجابة على الإسئلة الخاصة بكم فيما بتالية حسب التعليمات الموجودة بأدناه، ولكم جزيل الشكر والثناء.

أرجوا منكم لطفاً الإجابة و إعادة الإستبيان في فترة لا تزيد عن أسبوعين.

<u>Section (4): Specific questions required for conflict analysis</u>

Q1. Please recall our discussion in the first part of the interview survey about (1) your project involvement, (2) the issues that cause conflicts, and (3) the management strategies used to avoid them. Which of the statements in Table 2 describe your project? (Please circle 1st 2nd or 3rd as applicable in Q1 column for each statement in the conflict analysis table below).

س1 : بأستذكار المقابلة الشخصية السابقة والتي تم إجراءها معكم والتي أشرتم فيها بالمرحلة أو المراحل من المشروع التذي تم مناقشتة وكذلك أسباب النزاعات والإستراتجية التي يمكن تطبيقاه في لتجنب و تلك النزاعات بناء على ذلك ، أى من العبارات الموجودة في الجدول رقم   2والتي تصف هذا المشروع ؟ أرجوا تحديد الإجابة كما هو مطابق مع مشروعك بإختبار رقم 1 أو 2 أو 3 في العمود س1 لكل العبارات التالية في جدول تحليل النزاعات.

Q*2*. If you circle (1) in Q2, please circle one number in Q*2* to indicate your estimation of the intensity level of the conflict related to the experience described by yourself or others where:

س2 : إذا تم أختيار رقم 1 من العمود س1 ، أرجوا منك المبادرة وأختبارأحد الإرقام الموجودة في العمود

والتي تصف تقديرك لشدة النزاع الذى حدث بين الإطراف المتنازعة في المشروع2س

(1)Latent conflict: an existing underlying source of conflict which may or may not come to the attention of or sometimes ends up being unnoticed by the other person or group.
نزاع كامن : مصدر كامن للنزاع ، يمكن لكلا من أطراف المشروع ملاحظته و يمكن عدم ذلك

(2)Perceived conflict: one or more parties begin to recognize a conflict.
نزاع منظور : بداية لنزاع يمكن لطرف أو أكثر في المشروع التعرف علية.

(3) Felt conflict **:** a conflict which becomes personalized.
نزاع محسوس : نزاع أصبح شخصي بين أطراف المشروع.

(4) Manifest conflict: a conflict enacted through behaviour by one or more parties.
نزاع واضح : هو نزاع يكون يكون ظاهر على سلوك أطرفيه

(5) Conflict aftermath **:** where the conflict is in serious need of genuine resolution.
نزاع شديد :يحتاج للتعامل معه حل لانهائه

<table>
<tr><td colspan="2">conflict analysis
جدول تحليل النزاع</td><td colspan="3">Q1
س1
1st 2nd 3rd</td><td colspan="5">Q2(س2)
Intensity level of conflict
Lowest Highest
الاعلى
الإقل</td></tr>
<tr><td colspan="2">Statements
العبارات</td><td>Agree
أوافق</td><td>Dis-agree
لا أوافق</td><td>N/A or don't Know
غير منطبق</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr>
<tr><td colspan="10">Part1 : Per-design phase . . . if you had no concern with any of below statements then go to Part 2

الجزء الإول : مرحلة ما قبل التصميم ... إذا لم يكن لك علاقة بأحد العبارات التالية ، أرجوا الإنتقال إلى الجزء رقم 2 .</td></tr>
<tr><td>2a</td><td>The client was not fully clear on identifying project requirements and objectives.

الزبون لم يكن وأضحاً في تعريف أهدافة ومتطلباتة من المشروع.</td><td>1</td><td>2</td><td>3</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr>
<tr><td>32</td><td>The client was inexperienced and did not know how to proceed in terms of the project needs and requirements.

الزبون لم يكن ذو خبرة ولم يكن يعرف كيف يقدم متطلبات وأحتياجات المشروع.</td><td>1</td><td>2</td><td>3</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr>
<tr><td>54</td><td>The information assembly during the design brief was ineffective.

جمع البيانات أو المعلومات خلال مرحلة التصميم المبدئي لم تكن فاعلة.</td><td>1</td><td>2</td><td>3</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr>
<tr><td>12</td><td>The early cost estimation at the planning/strategy stage was inaccurate or quite far removed from the actual cost.

التقدير المبدئي للتكلفة أثناء مرحلة التخطيط كان غير دقيق أو بعيد عن التكلفة الحقيقة.</td><td>1</td><td>2</td><td>3</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr>
</table>

77	The client was too late in selecting and gaining ownership of a proper project site الزبون تأخر في أختيار وأمتلاك أرض مناسبة للمشروع.	1	2	3	1	2	3	4	5
66	The geotechnical report was not factual. تقرير أختبار التربة لم يكن واقعي.	1	2	3	1	2	3	4	5
50	The architect was not competent enough to produce good design work. المصمم المعماري لم يكن ذو كفاءة بشكل كافي حتي ينتج أعمال تصممصم جيدة.	1	2	3	1	2	3	4	5
Part2 : Per-construction phase . . . if you had no concern with any of below statements then go to Part 3 **الجزء الثاني : مرحلة ما قبل التشييد ... إذا لم يكن لك علاقة بأحد العبارات التالية ، أرجوا الإنتقال إلى الجزء رقم 3 .**									
87	The utilities services were not available at the project site. خدمات البنى التحتية لم تكن موجودة في موقع المشروع.	1	2	3	1	2	3	4	5
21	The architect did not include the utilities services connection data in the design drawing/document. المصمم المعماري لم يضمن بيانات توصيل أو ربط خدمات البنى التحتية في الرسومات المعمارية.	1	2	3	1	2	3	4	5
55	The utilities services connection points were not indicated within the design drawing / document. بيانات توصيل أو ربط خدمات البنى التحتية لم تكن موضحة في الرسومات المعمارية .	1	2	3	1	2	3	4	5
78	The utilities connection expenses were not included in the contract document. تكاليف ربط البنى التحتية لم تكن مضمنة في العقد.	1	2	3	1	2	3	4	5
62	There was a lack of co-ordination and communication between the architect and structural engineer. كان هناك قصور في التواصل والتنسيق بين المهندس المعمارى والمهندس الإنشائي.	1	2	3	1	2	3	4	5
41	Error(s) or some architectural design solutions were not compatible with the shop drawing at the design phase. أخطاء أو أن الحلول التصميم المعماري كانت غير منسجمة مع رسومات الشب دروانق في مرحلة التصممصم.	1	2	3	1	2	3	4	5
11	The architect missed (omission) or did not complete some architectural element or detail in the design drawing. المصمم المعماري غفل أو سهى أو لم يَفَصل في بعض عناصر التصمم.	1	2	3	1	2	3	4	5
45	The structural design was not compatible with the architectural design. التصميم الإنشائي لم يكم منسجماً مع التصميم المعماري.	1	2	3	1	2	3	4	5

14	The architectural design contained some errors. التصممصم المعماري كان يحتوى على بعض الإخطاء.	1	2	3	1	2	3	4	5
D21	There was a conflict between the architect and the client at the design development phase when a client's order to make design change(s) was issued. كان هنالك نزاع بين المصمم والزبون في مرحلة التصميم وذلك عندما أصدر الزبون أمر تغيير على التصميم.	1	2	3	1	2	3	4	5
70	The client rejected or did not approve in writing his variation(s) order over some aspects of design at the design development or completion stage. الزبون رفض أو لم يعتمد كتابياً أمر التغير الصادر منه على بعض جوانب التصميم في مرحلة تطوير التصميم أو عند أستكمالة .	1	2	3	1	2	3	4	5
72	There was a discrepancy or inconsistency between bill of quantities document and design drawings. كان هناك تعارض أو تناقض بين وثيقة جدول الكميات و الرسومات المعمارية.	1	2	3	1	2	3	4	5
23	Some project specifications were inconsistent with design drawings. بعض بنود وثيقة الموصفات تتناقض مع الرسومات المعمارية .	1	2	3	1	2	3	4	5
44	Some project specification descriptions conflicted with bill of quantities document. وصف بعض العناصر في وثيقة الموصفات تتعارض مع ما يماثلها في وثيقة جدول الكميات.	1	2	3	1	2	3	4	5
89	Ambiguous specifications document resulted in different interpretations by the project parties. غموض في بعض بنود وثيقة الموصفات أدى إلى تفاسير مختلفة ومتضاربة من قبل أطراف المشروع.	1	2	3	1	2	3	4	5
39	There were two measurement methods (inconsistency) in bill of quantities document. كان هناك طريقتين للقياس(تناقض) لبعض بنود جدول الكميات.	1	2	3	1	2	3	4	5
56	Insufficient time was given to the architect to develop all design drawings /documents. وقت غير كافي إعطي للمصمم لإنتاج كامل الرسومات والوثائق المعمارية.	1	2	3	1	2	3	4	5
67	Disagreement over not finishing design document on time. عدم توافق أو رضا حول عدم أنهاء التصممصم المعمارى في الوقت.	1	2	3	1	2	3	4	5

92	Lack of client effectiveness was a reason for architect design schedule to be delayed. قصور في مدى فاعلية الزبون كان سبباً في أن أعمال المصمم تتأخر في الإنجاز.	1	2	3	1	2	3	4	5
47	The tender price submitted by the contractor was accepted based on unrealistic cost estimation. العطاء المقدم من المقاول تم قبولة بينما كان يحوى تقدير تكلفة للمشروع غير منطقي.	1	2	3	1	2	3	4	5
3	The 'lowest-price wins' tendering selection method was encouraged competitors to not carefully evaluate the tender price. طريقة أختيار العطاء على أساس " السعر الإقل يفوز" كان مشجعة للمقاولين المتنافسيين أن يقدرون سعرللعطاء غير مدروس بعناية .	1	2	3	1	2	3	4	5
9	The 'lowest-price wins' as tendering selection method was a prime factor of not selected a qualified architect or contractor. طريقة أختيار العطاء على أساس " السعر الإقل يفوز" كان السبب الرئيسي في أن يتم أختيار المصمم أو المقاول ذو الكفاءة الغير جيدة.	1	2	3	1	2	3	4	5
35	An incompetent contractor was selected to perform the project. مقاول غير جيد الكفاءة تم أختيارة لتنفيذ المشروع.	1	2	3	1	2	3	4	5
19	The project consultant was not competent to fulfil his job. الإستشاري كان غير ذو كفاءة لإداء مهامة.	1	2	3	1	2	3	4	5
48	An incompetent subcontractor was chosen to perform some work packages. تم أختيار مقاول بالباطن غير كفاءة لإداء بعض الإعمال.	1	2	3	1	2	3	4	5
4	Due to unbalanced risk allocation of the PWC contract, conflict duly occurred. نتيجة لعدم توازن المخاطرة لعقد الإشغال العامة ظهر هناك نزاع .	1	2	3	1	2	3	4	5
34	Some of the contract conditions were unclear and had loopholes. بعض شروط العقد كانت عدم وأضحة ويوجد بها ثغور.	1	2	3	1	2	3	4	5
59	The PWC 'Public Work Contract' scope of work was ambiguous/ overlapped. نطاق العمل في عقد الإشغال العامة كان به غموض أو تداخل .	1	2	3	1	2	3	4	5
79	There was a conflict owing to a lack of contractual provisions to address proposed changes to orders. كان هنالك نزاع نتيجة لقصور بنود العقد في أستيعاب أوامر التغيير .	1	2	3	1	2	3	4	5

65	Lack of contractual provision items addressing unexpected increases in prices of construction materials. قصور في بنود العقدلإستيعاب الزيادة الغير متوقعة لإسعار مواد البناء.	1	2	3	1	2	3	4	5
Part3 : Construction phase . . . if you had no concern with any of below statements then go to Part 4 **الجزء الثالث : مرحلة التشييد ... إذا لم يكن لك علاقة بأحد العبارات التالية ، أرجوا الإنتقال إلى الجزء رقم 4 .**									
26	Lack of communication between the project participants/team members was a cause of some problems during the construction phase. قصور التواصل بين المساهمين أو فريق عمل المشروع كان سبباً في بعض المشاكل خلال مرحلة التشييد.	1	2	3	1	2	3	4	5
17	There was a dispute due to unforeseen ground conditions or foundation problems during the construction phase. كان هنالك نزاع نتيجة لحالة التحت سطحية للتربة الغير متوقعة لموقع البناء أو لمشاكلةً في قواعد المبني خلال مرحلة التشييد.	1	2	3	1	2	3	4	5
57	There were instances of poor performance in terms of methods of work, inadequate supervision, quality control or other factors on the part of the main contractor. كان هنالك أمثلة في الإداء الردئ من ناحية طريقة العمل ، الإشراف ، ضبط الجودة أو أمورأخرى من قَبل المقاول الرئيسي .	1	2	3	1	2	3	4	5
25	There were instances of poor performance by the subcontractor. كان هنالك أمثلة في الإداء الردئ قَبل المقاول بالباطن	1	2	3	1	2	3	4	5
18	There were instances of poor performance in terms of the methods of work, inadequate supervision, quality control or other factors on the part of the design consultant. كان هنالك أمثلة في الإداء الردئ من ناحية طريقة العمل ، الإشراف ، ضبط الجودة أو أمورأخرى من قَبل المصمم الإستشارى.	1	2	3	1	2	3	4	5
91	One or more error (s) or defects occurred on the construction work. خطاء أو أكثر أو عيوب ظهرت في أعمال التشييد.	1	2	3	1	2	3	4	5
109	There were some instances of substandard or low quality workmanship during the construction. كان هناك أمثلة رداءة الجودة أو جودة العمل المتوضعة.	1	2	3	1	2	3	4	5
100	Connecting the utilities service to the building /facility was an issue of dispute. ربط خدمات البناء التحتية بالمبني كانت مسألة نزاعية .	1	2	3	1	2	3	4	5

102	Disagreement over what kind of materials specifications should be supplied or used to meet the building design. خلاف أو عدم أتفاق حول أى نوع من مواد البناء أو الموصفات ينبغي أن يورد أو يستخدم ليتناسب مع تصميم المبني.	1	2	3	1	2	3	4	5
51	Conflicts due to emerging new requirements of construction materials /components which were not originally in the bill of quantity document. نزاع نتيجة لظهور مواد جديدة أو أضافية لم تكن موجودة أصلاً في جدول الكميات.	1	2	3	1	2	3	4	5
5	An increase in the prices of some construction materials (bill of quantity) during the construction phase was an issue of dispute. زيادة أسعار بعض مواد البناء خلال مرحلة التشييد كان مسألة نزاعية.	1	2	3	1	2	3	4	5
46	Some of the electrical/mechanical machines that were purchased or supplied were incompatible with the project requirements or did not fit with the building design. بعض التوريدات الكهربائية أوالمكانيكية التي تم شرائها وتوريدها كانت غير مناسبة لمتطلبات المشروع أو لم تكن تتوائم مع تصميم المبني.	1	2	3	1	2	3	4	5
85	Some of the purchased / supplied mechanical machines did not comply with the bill of quantity description. بعض التوريدات الكهربائية أوالمكانيكية التي تم شرائها وتوريدها لم تكن مطابقة لما هو موجود في وثيقة جدول الكميات.	1	2	3	1	2	3	4	5
73	The subcontractor was not fully familiar with some of the technical aspects associated with supply. المقاول بالباطن لم يكن يعرف تماما بعض الجوانب الفنية المصاحبة للمعدات أو الإجهزة التي يوردها.	1	2	3	1	2	3	4	5
43	Orders for purchasing or supplying should be approved by the liable person in writing. أوامر الشراء ينبغي أن تكون معتمدة كتابياً بواسطة الشخص المسؤول.	1	2	3	1	2	3	4	5
C11	Change or variation order(s) made by the client over the contractor. أمر أو أوامر تغيير أصدرها الزبون إلى المقاول الرئيسي .	1	2	3	1	2	3	4	5
98	Change or variation order was not recorded in writing. أمر أو أوامر التغيير لم تكن موثقة كتابياً.	1	2	3	1	2	3	4	5
84	Additional effort was needed by the main contractor to fulfil some construction elements which were missing from the design drawing. كان هناك حاجة لعمل جهد أضافي من المقاول لتحقيق بعض عناصر المشروع والتي كانت قد أغفلت في التصميم المعماري.	1	2	3	1	2	3	4	5

30	The project progression or handover was over schedule (delayed). كان هنالك تأخرفي مدى تقدم المشروع أو أستكمالة حسب الجدول الزمني.	1	2	3	1	2	3	4	5
74	A dispute arose over the project delay due to slowness in site selection and acquisition. كان هنالك تأخرفي تقدم المشروع نتيجة البطئ في أختيار وأمتلاك موقع للمبني.	1	2	3	1	2	3	4	5
68	The contractor received a late submission of shop drawing. المقاول أستلم الشوب دروانق متأخراً.	1	2	3	1	2	3	4	5
53	The project was delayed due to the slowness of the decision-making process or bureaucracy of the client or client representative. كان هنالك تأخرفي تقدم المشروع نتيجة للبطئ في أتخاز القرارات والبيقراطية من قَبل الزبون أو من يمثلة.	1	2	3	1	2	3	4	5
64	The project handover was delayed due to client's hesitation or insistence on following his own interests or requirements. كان هنالك تأخرفي تقدم المشروع نتيجة تردد الزبون أو أصرارة على المضى في أهتماماتة أو متطلباتة.	1	2	3	1	2	3	4	5
38	Delay in the supplying of some materials led to a delay in the project handover. تأخرحدث في تسليم المشروع نتيجة تأخر توريد بعض مواد البناء.	1	2	3	1	2	3	4	5
29	The project was delayed due to a shortage of contractor labour. المشروع تأخر نتيجة لقصور في عدد عمالة المقاول.	1	2	3	1	2	3	4	5
101	There was a disagreement over the payment of additional compensation to the architect agent/firm. كان هنالك تأخير في دفع المستحقات أو التعويضات للمكتب أو شركة التصميم.	1	2	3	1	2	3	4	5
13	There was disagreement over the contractor’s claims that he hadn’t received some payment by the client. كان هنالك عدم أتفاق أو خلاف حول إدعاء المقاول بأنة لم يستلم بعض أستحقاقاتة المالية من الزبون.	1	2	3	1	2	3	4	5
49	There was a dispute when the contractor requested additional payment to cover the overrunning of the project cost. كان هنالك نزاع نتيجة لان المقاول طلب تعويض مالي أضافي نتيجة للتكافة الإضافية التي ظهرت في المشروع .	1	2	3	1	2	3	4	5
103	There was disagreement between the client and the contractor over method of payment. كان هنالك خلاف بين الزبون والمقاول حول طريقة الدفع .	1	2	3	1	2	3	4	5

97	There was a conflict between the contractor and the other project parties over interim payments. كان هنالك نزاع حول الدفعة المالية المؤقتة المسلمة من المقاول إلى أطراف المشروع الإخرين.	1	2	3	1	2	3	4	5
88	There was a conflict as a result of the method of payment was not fully explained in the contract. كان هنالك خلاف حول طريقة الدفع ذلك لانها لم تكن مشروحة بشكل كافي في العقد.	1	2	3	1	2	3	4	5
2	Delayed payment for the contractor. تأخر المقاول في أستلام الدفعات المالية.	1	2	3	1	2	3	4	5
Part4 : Commissioning and completion phase . . . if you had no concern with any of below statements then go to Part *5* **الجزء الربعة : مرحلة التفتيش والأكمال ... إذا لم يكن لك علاقة بأحد العبارات التالية ، أرجوا الإنتقال إلى الجزء رقم** *5* .									
52	Causing a delay or deliberately creating obstacles over taking possession of the building or handover of project by the client or client's representative to achieve some personal gain. تأخيرمتعمد أو أصتناع عوائق في أجراءات تسليم و أنهاء المشروع بهدف الوصول إلى بعض المصالح الشخصية.	1	2	3	1	2	3	4	5
107	There was a delay by the client during the procedure for project acceptance and handover. كان هنالك تأخير من الزبون لإنهاء أجراءات القبول والتسليم.								
20	An inexperienced person was involved in the project acceptance and handover process. أنخراط شخص من غير ذوى الكفاءة في إجراءات القبول والتسليم.	1	2	3	1	2	3	4	5
Part5: General administration and regulation . . . please complete ALL below statements of part *5* **الجزء الخامس : الإدارة العامة والتنظيم ... أرجوا لإجابة على جميع العبارات الموجودة في جزء** *5* .									
16	A client was ***non- compliant*** with some of contractual obligations. الزبون لم يكن ملتزماً ببعض ألتزاماته العقدية.	1	2	3	1	2	3	4	5
8	The contractor illegally passed on his full or partial contractual obligation to another contractor without obtaining the client's permission. المقاول بشكل غير نظامي يمرر ألتزاماته العقدية إلى مقاول أخر بدون اخذ أذن الزبون.	1	2	3	1	2	3	4	5
71	Subcontractor . . . المقاول بالباطن بشكل	1	2	3	1	2	3	4	5

6	Faults or weaknesses in the contractor's classification system and how it is formulated can hinder the selection of an efficient contractor. عيوب أو ضعف في نظام تصنيف المقاولين وكيف ان صياغتة ممكن أن تعيق أختيار المقاول ذو الكفاءة.	1	2	3	1	2	3	4	5
10	The lack of an effective classification system for design consultancy services agents contributes to unenlightened selection of non-qualified agents. القصور في فعالية نظام تصنيف مكاتب التصميم الإستشارية ممكن أن تساهم في الإختيار الغير متبصر للمكاتب أو الشركات من غير ذوى الكفاءة.	1	2	3	1	2	3	4	5

Thank you for completing this survey

شكرا جزيلا على أكمال الإستبيان

Please **reply back** this questionnaire to mr_alshehri@yahoo.com
Or to fax #: + 966(0) 12920808

لرد الإستبيان ، أرجوا أرسالة على الايميل أو رقم الفاكس الموضح بعالية.

Do you wish to receive a copy of the results (please provide contact details)

YE ☐
NO ☐
هل تريد نسخة من البحث ،
نعم ☐ **لا** ☐

Abdullah M. Alshehri
Telephone No.: Office +44 (0) 161 275 4409   KSA Mobile No: + 966(0)504486409
UK Mobile No: +44(0)7525167177

Appendix D

Data Table				
#	**Description of data type**	**Latent**	**Conflict**	**PM**
Pre-Design				
2a	The project owner was not fully clear on identifying project requirements and objectives.	R01-1/R L10-19/R Gd14-2/R FH19-02/R AH17-13/R AJ30-02/R		FH19-05/PM AJ30-03/PM
32	The project owner was inexperienced and did not know how to proceed in terms of the project needs and requirements.	Ab02-5/R N05-8/R		FH19-15/PM
54	The information assembly during the design brief was ineffective.	EA20-13/R FH19-13/R		EA20-14/PM
12	Inaccurate cost estimation at the pre-design phase.	ST21-14/R MG22-08/R		M03-5/PM MG22-09/PM
77	The project owner was too late in selecting and gaining ownership of a proper project site	JS12-02/R Ak13-05/R		JS12-04/PM
66	The geotechnical report was not factual.	EA20-02/R ST21-10/R HS23-11/R AH17-08/R		
113	Considering the uncertainty associated with unforeseen subsurface conditions of the project site in PWC contract.			ST21-12/PM EA20-03/PM AH17-18/PM
50	The architect was not competent enough to produce good design work.	S04-11/R R01-6/R T07-04/R		
63	To change the design tender selection process of a qualification-based selection rather than one based on lowest price.			S04-12/PM
Pre-construction phase				
87	The utilities services were not available at the project site.	Ak13-06/R		
21	The architect did not include the utilities services connection data in the design drawing/document.	Y09-33/R		
55	The utilities services connection points were not indicated within the design drawing / document.	EA20-16/R SS26-02/R		EA20-17/PM Y09-35/PM
78	The utilities connection expenses were not included in the contract document.	MG22-05/R		SS26-05/PM
58	Form regular meetings in design development phase within/between design team members.			Y09-6/PM SS26-17/PM
62	There was a lack of co-ordination and communication between the architect and structural engineer or supplier.	Y09-04/R GH25-02/R SS26-12/R		
22	Early liaison between the architect and suppliers/manufacturers to check architectural			Y09-15/PM

	design solutions for materials /machines installation.			
41	Error(s) or some architectural design solutions were not compatible with the shop drawing at the design phase.	Y09-14/R SS26-15/R		
11	The architect missed (omission) or did not complete some architectural element or detail in the design drawing.	ST21-11/R Ak13-17/R Y09-9/R		
45	The structural design was not compatible with the architectural design.	SS26-13/R GH25-02/R		
14	The architectural design contained some errors.	AH17-12/R L10-21/R		
69	The need to select the best 'qualified' architect rather than lowest price one.			S04-5/PM
D21	The project owner at the design development phase asked the architect make design change(s).	M03-11/R S04-9/R Gd14-3/R AD27-08/R	Gd14-11/C FH19-01/C FH19-12/C AD27-10/C	FH19-10/PM
70	The project owner rejected or did not approve in writing his change(s) order over some aspects of design at the design development or completion stage.		FH19-08/C FH19-16/C	
42	The need to establish common construction law to address any contractual document deficiencies.			AS24-11/PM
72	There was a discrepancy or inconsistency between bill of quantities document and design drawings.	Y09-27/R EM16-12/R L10-3/R MG22-13/R GH25-12/R		EM16-13/PM GH25-05/PM
23	Some project specifications were inconsistent with design drawings.	HS23-08/R	EM16-1/C	
44	Some project specification descriptions conflicted with bill of quantities document.	Y09-30/R N05-4/R		Y09-31/PM
89	Ambiguous specifications document resulted in different interpretations by the project parties.	La15-06/R La15-17/R M03-9/R EA20-10/R MG22-10/R AS24-09/R HS23-17/R	La15-05/C	EA20-12/PM La15-07/PM GH25-14/PM HS23-09/PM
39	There were two measurement methods (inconsistency) in bill of quantities document.	GH25-03/R	EM16-04/C	
56	Insufficient *time was given to the architect* to develop all design drawings /documents.	L10-4/R N05-6/R		
61	The need to give the *architect* sufficient time to develop good design drawings/document.			L10-5/PM
67	Disagreement over not finishing design document on time.		Gd14-08/C AD27-01/C	

92	Lack of project owner effectiveness was a reason for architect design schedule to be delayed.	Gd14-09/R AD27-02/R	FH19-06/C	
47	The tender price submitted by the contractor was accepted based on unrealistic cost estimation.	M03-4/R La15-16/R S04-6/R MS18-05/R		La15-18/PM
3	The 'lowest-price wins' tendering selection method was encouraged competitors to not carefully evaluate the tender price.	La15-15/R JS12-25/R		
9	The 'lowest-price wins' as tendering selection method was a prime factor of not selected a qualified architect or contractor.	D06-08/R T07-04b/R		
28	Apply pre-qualification process during tendering phase.			AS24-17/PM SS26-21/PM Y09-38/PM AF28-05/PM
35	An incompetent contractor was selected to perform the project.	JS12-16/R T07-06/R M03-7/R MA08-11/R La15-16/R AF28-02/R		AF28-06/PM
19	The project consultant was not competent to fulfil his job.	Ak13-21/R MA08-7/R		
7	An early provision of a list of subcontractors by the main contractor after the tender had been awarded and before the construction phase gets started.			AS24-12/PM
48	An incompetent subcontractor was chosen to perform some work packages.	MS18-09/R EA20-09/R		MS18-10/PM
4	Due to unbalanced risk allocation of the PWC contract, conflict duly occurred.	MA08-03/R Ab02-4/R S04-2/R		
34	Some of the contract conditions were unclear and had loopholes.	N05-2/R Ab02-2/R M03-8/R		
59	The PWC 'Public Work Contract' scope of work was ambiguous/ overlapped.	Ab02-4/R JS12-23/R L10-07/R	JS12-22/C L10-06/C	
75	Need to take note of the advantages of various professional international standards of contracts to improve the PWC contracts.			Ab02-8/PM T07-14/PM HS2314/PM D06-10/PM M03-17/PM EM16-11/PM
79	There was a conflict owing to a lack of contractual provisions to address proposed changes orders.	HS23-15/R N05-5/R		
65	Lack of contractual provision items addressing unexpected increases in prices of construction materials.	ST21-02/R SS26-09/R MA08-10/R		JS12-20/PM SS26-10/PM

Construction phase				
26	Lack of communication between the project participants/team members was a cause of some problems during the construction phase.	La15-10/R AH17-15/R M03-19/R AS24-02/R		
60	Involvement of the design team in construction team meetings.			M03-22/PM AS24-06/PM
82	Application of effective contract management.			D06-3/PM S04-15/PM MA08-04/PM
17	There was a dispute due to unforeseen ground conditions or foundation problems during the construction phase.		AH17-07/C EA20-01/C ST21-09/C HS23-10/C SS26-06/C	
57	There were instances of poor performance in terms of methods of work, inadequate supervision, quality control or other factors on the part of the main contractor.	MS18-04/R N05-10/R M03-13/R MA08-11/R Ak13-20/R Y09-24/R AF28-01/C	JS12-15/C	
116	Early exclusion of the contractor or the subcontractor as soon as signs of a poor level of performance and workmanship to project become apparent.			MS18-10/PM
25	There were instances of poor performance by the subcontractor.		Y09-19/C MS18-07/C	
18	There were instances of poor performance in terms of the methods of work, inadequate supervision, quality control or other factors on the part of the design consultant.	MA08-07/R JS12-13/R Ak13-21/R S04-17/R	HS23-01/C	
115	Regular evaluation to the consultant' performance.			JS12-14/PM
91	One or more error (s) or defects occurred on the construction work.		Y09-8/C N05-15/C Ak13-19/C MS18-08/C	
109	There were some instances of substandard or low quality workmanship during the construction.		T07-09/C Y09-23/C MS18-01/C AS24-01/C	
112	Main contractors should be contractually committed to forming a quality control team at large project.			Y09-25/PM
100	Connecting the utilities service to the building /facility was an issue of dispute.		AH17-14/C EA20-15/C	
36	Early project team coordination and liaison with the local authority.			EA20-21/PM AH17-16/PM

102	Disagreement over what kind of materials specifications should be supplied or used to meet the building design.		EM16-12/C L10-3/C Y09-3C HS23-07/C HS23-16/C GH25-08/C MK29-02/C	
51	Conflicts due to emerging new requirements of construction materials /components which were not originally in the bill of quantity document.	H11-1/R	EM16-08/C Y09-3/C MG22-01/C MG22-04/C MG22-12/C GH025-01/C GH25-11/C Y09-26/C MK29-04/C AJ30-01/R	
5	An increase in the prices of some construction materials (bill of quantity) during the construction phase was an issue of dispute.	L10-13/R H11-05a/R	Y09-1/C La15-21/C JS12-19/C ST21-01/C SS26-08/C	
46	Some of the electrical/mechanical machines that were purchased or supplied were incompatible with the project requirements or did not fit with the building design.	GH25-09/R	Y09-13/C L10-1/C L10-11/C	
85	Some of the purchased / supplied mechanical machines did not comply with the bill of quantity description.	L10-02/R	L10-08/C	
73	The subcontractor was not fully familiar with some of the technical aspects associated with supply.	L10-12/R		
43	Orders for purchasing or supplying should be approved by the liable person in writing.	L10-09/R		L10-25/PM MK29-03/PM
C11	Change or variation order(s) made by the project owner over the contractor.	N05-12/R Ak13-4/R	M03-10/C La15-09/C HS23-14/C L10-18/C Ak13-13/C AH17-11/C EA20-13/C SS26-01/C SS26-11/C MK29-01/C	
98	Change or variation order was not recorded in writing.	T07-03/R S04-4/R N05-14/R		Ak13-14/PM D06-6/PM
81	The need to settle disagreements by negotiation.			R01-13/PM
84	Additional effort was needed by the main contractor to fulfil some construction elements which were missing from the design drawing.		Y09-05/C Ak13-16/C	
30	The project progression or handover was over schedule (delayed).	MA08-06/R N05-11/R	Ak13-08/C Ak13-01/C	

		H11-05b/R	EA20-05/C AS24-07/C AS24-13/C AH17-01/C AF28-05/C	
74	A dispute arose over the project delay due to slowness in site selection and acquisition.		Ak13-1/C JS12-1/C	
68	The contractor received a late submission of shop drawing.	AS24-03/R AH17-03/R		
53	The project was delayed due to the slowness of the decision-making process or bureaucracy of the project owner or client representative.	D06-7/R M03-15/R Ak13-2/R MA08-09/R L10-16/R Ak13-09/R JS12-07/R	L10-15/C Ak13-11/C	
64	The project handover was delayed due to client's hesitation or insistence on following his own interests or requirements.	Ak13-12/R AS24-08/R		
24	Any reason (s) given for delay in the construction process should be in writing.			D06-11/PM Ak13-07/PM
38	Delay in the supplying of some materials led to a delay in the project handover.	EA20-06/R		
29	The project was delayed due to a shortage of contractor labour.	AH17-02/R		
101	There was a disagreement over the payment of additional compensation to the architect agent/firm.		Gd14-1/C R01-5/C M03-18/C AD27-05/C AD27-07/C	
13	There was disagreement over the contractor's claims that he hadn't received some payment by the client.		ST21-05/C HS23-04/C	
49	There was a dispute when the contractor requested additional payment to cover the overrunning of the project cost.		ST21-13/C MG 22-07/C	
103	There was disagreement between the project owner and the contractor over method of payment.		MS18-02/C	
97	There was a conflict between the contractor and the other project parties over interim payments.	AS24-14/R	EM16-13/C	Y09-17/PM
88	T ere was a conflict as a result of the method of payment was not fully explained in the contract.	EM16-04/R ST21-05/R EM16-14/R MS18-03/R		
111	A clearer and more detailed payment mechanism should be specified in the contract.			M03-14/PM EM16-6/PM
2	Delayed payment for the contractor.	JS12-07/R S04-19/R T07-07/R N05-1/R N05-3/R MA08-05/R	La15-13/C JS12-06/C	

Commissioning and completion phase				
52	Causing a delay or deliberately creating obstacles over taking possession of the building or handover of project by the project owner or client's representative to achieve some personal gain.	JS12-11/R R01-8/R HS23-02/R HS23-18/R		
107	There was a delay by the project owner during the procedure for project acceptance and handover.		JS12-10/C La15-13/C T07-01/C	
20	An inexperienced person was involved in the project acceptance and handover process.	La15-14/R S04-18/R N05-7/R		LA15-16/PM
General Administration and Regulation				
16	A project owner was *non- compliant* with some of contractual obligations.	AD27-06/R SS26-20/R FH19-9/R	Gd14-05/C	
8	The contractor illegally bid rigging his full or partial contractual obligation to another contractor.	M03-12/R T07-13b/R		
71	Subcontractor . . .	Y09-20/R La15-26/R		
15	A large number of public project bids should not be awarded to a single contracting firm.			M03-28/PM
6	Faults or weaknesses in the contractor's classification system and how it is formulated can hinder the selection of an efficient contractor.	Ab02-06/R S04-07/R M03-06/R D06-14/R HS23-20R		
10	The lack of an effective classification system for design consultancy services agents contributes to unenlightened selection of non-qualified agents.	R01-10/R N05-09/R M03-06a/R		
27	Avoiding litigation by establishing regulations for other dispute resolution methods such as negotiation, mediation, etc to be used by disputants.			R01-13/PM T07-12/PM N05-17/PM L10-22/PM D06-12/PM MA08-12/PM
31	Changing the regulations to allow arbitration techniques to be used for public project disputes.			S04-2 0/PM Ab02-10/PM
33	Establish an Arbitration Centre.			S04-22/PM N05-19/PM
37	Arbitration should be applied.			ST21-07/PM M03-23/PM N05-20/PM MA08-13/PM

Appendix E

Validation table					
#	**Description of data**	**Before the validation data processing**	**After the validation data processing**	
		All responses in agreement	**Responses in agreement**	**Responses in disagreement**
Pre-Design				
2a	The project owner was not fully clear on identifying project requirements and objectives.	AD27V FH19V Gd14V AH17V La15V L10V Ak13V	L10/A Gd14/A FH19/A AH17/A	
32	The project owner was inexperienced and did not know how to proceed in terms of the project needs and requirements.	EA20V N05V	N05/A	
54	The information assembly during the design brief was ineffective.	FH19V	FH19/A	
12	Inaccurate cost estimation at the pre-design phase .	MG22V M03V ST21V	ST21/A MG22/A	
77	The project owner was too late in selecting and gaining ownership of a proper project site.	Ak13V	Ak13/A	
66	The geotechnical report was not factual.	HS23V ST21V Y09V GA25V EA20V AH17V	EA20/A ST21/A HS23/A AH17/A	
50	The architect was not competent enough to produce good design work.	S04V N05V L10V ST21V	S04/A	
Pre-construction phase				
87	The utilities services were not available at the project site.	SS-26V EA-20V		
21	The architect did not include the utilities services connection data in the design drawing/document.	EA20V MG22V La15V Y09V	Y09/A	
55	The utilities services connection points were not indicated within the design drawing / document.	SS26V EA20V	EA20/A SS26/A	
78	The utilities connection expenses were not included in the contract document.	MG22V Y09V	MG22/A	

2	There was a lack of co-ordination and communication between the architect and structural engineer or supplier.	GH25V SS26V La15V	GH25/A SS26/A	
41	Errors or some architectural design solutions were not compatible with the shop drawing at the design phase.	SS26V Y09V	Y09/A SS26/A	
11	The architect missed (omission) or did not complete some architectural element or detail in the design drawing.	AK13V	Ak13/A	
45	The structural design was not compatible with the architectural design.	SS26V GA25V	SS26/A GH25/A	
14	The architectural design contained some errors.	SS26V M03V AH17V	AH17/A	
D21	The project owner at the design development phase asked the architect make design change(s).	SS26V M03V Ak13V FH19V	M03/A FH19/A	Gd14/D AD27/D
70	The project owner rejected or did not approve in writing his change(s) order over some aspects of design at the design development or completion stage .	Gd14V		
72	There was a discrepancy or inconsistency between bill of quantities document and design drawings.	MG22V GH25V Y09V EM16V L10V	Y09/A EM16/A L10/A MG22/A GH25/A	
23	Some project specifications were inconsistent with design drawings.	HS23V MK29V EM16V GA25V N05V	HS23/A EM16/A	
44	Some project specification descriptions conflicted with bill of quantities document.	N05V	N05/A	
89	Ambiguous specifications resulted in different interpretations by the project parties.	MG22V AS24V HS23V M03 La15V EA20V	La15/A M03/A EA20/A MG22/A AS24/A HS23/A	
39	There were two measurement methods (inconsistency) in bill of quantities document.	GH25V La15V EM16V		
5	Insufficient time was given to the architect to develop all design drawings /documents.	AD27V L10V Gd14V	L10/A	N05/D
67	Disagreement over not finishing design document on time.	AD27V Gd14V La15V	Gd14/A	AD27/D

92	Lack of project owner effectiveness led to delay in design development.	Gd14V La15V	Gd14/ A	
47	The tender price submitted by the contractor was accepted based on an unrealistic estimation.	La15V N05V MS18V	La15/A MS18/ A	MS 18/ D
3	The 'lowest-price wins' tendering selection method was encouraged competitors to not carefully evaluate the tender price.	AF28V M03V N05V La15V	La15/A	
9	The 'lowest-price wins' as tendering selection method was a prime factor in the selection of a qualified architect or contractor.	AF28V S04 V La15V		
35	An incompetent contractor was selected to perform the project.	AF28V Y09V M03V MS18V La 15V ST21V AS24V N05V	M03/A La15/A	
19	The project consultant was not competent to fulfil his job.			
48	An incompetent subcontractor was chosen to perform some work packages.	Y09V MS18V	MS18/ A	EA2 0/D
4	Due to unbalanced risk allocation of the PWC contract, conflict duly occurred.	SS26V N05V M03V		
34	Some of the contract conditions were unclear and had loopholes.	GA25 N05V La15V	N05/A	
59	The PWC 'Public Contract Work' scope of work was ambiguous/ overlapped.	L10V	L10/A	
79	There was a conflict owing to a lack of contractual provisions to address proposed changes to orders.	MK29V		HS2 3/D N05 /D
65	Lack of contractual provisions addressing unexpected increases in prices of construction materials.	SS26V S04V	SS26/A	
construction phase				
26	Lack of communication between the project participants/team members was a cause of some problems during the construction phase.	AS24V M03V M05V FH19V	M03/A AS24/A	
17	There was a dispute due to unforeseen ground conditions	SS26V HS23V	AH17/A EA20/A	

	or foundation problems during the construction phase.	Y09V AH17V ST21V EA20V	ST21/A HS23/A SS26/A	
57	There were instances of poor performance in terms of methods of work, inadequate supervision, quality control or other factors on the part of the main contractor.	HS23V AF28V MS18V La15V M03V Y09V N05V S04V	MS18/A N05/A M03/A Y09/A AF28/A	
25	There were instances of poor performance by the subcontractor.	Y09V MS18V L10V	Y09/A MS18/A	
18	There were instances of poor performance in terms of the methods of work, inadequate supervision, quality control or other factors on the part of the design consultant.	M18V Ak13V L10V	Ak13/A	S04/ D
91	One or more error (s) or defects occurred during the construction work.	AS24V AF28V M03V N05V	N05/A	MS18 /D
109	There were some instances of substandard or low quality workmanship during the construction.	AS24V HS23V Y09V M18V M03V S04V Gd14V	Y09/A MS18/A AS24/A	
100	Connecting the utilities service to the building /facility was an issue of dispute.	MG22V Y09V EA20V AH17V	AH17/A EA20/A	
102	Disagreement over what kind of materials specifications should be supplied to meet the building design.	HS23V GH25V MG22V L10V Y09V N05V	L10/A Y09/A GH25/A HS23/A	EM16 /D MK29 /D
51	Conflicts due to emerging new requirements of construction materials /components which were not originally in the bill of quantity document.	MG22V GH25V MK29V Y09V EM16V M03V Gd14V La15V	EM16/A MG22/A GH25/A Y09/A MK29/A	
5	An increase in the prices of some construction materials (bill of quantity) during the construction phase was an issue of dispute.	SS26V MK29V La15V ST21V	Y09-1/C ST21/A SS26/A	La10/ D

46	Some of the electrical/mechanical machines that were purchased or supplied were incompatible with the project requirements or did not fit with the building design.	GH25V MK29V L10V SS26V		
85	Some of the purchased / supplied mechanical machines did not comply with the bill of quantity description.	GH25V L10V	GH25/A	
73	The subcontractor was not fully familiar with some of the technical aspects associated with supply.	L10V	L10/A	
43	Orders for purchasing or supplying should be approved by the liable person in writing.	L10V		
C11	Changes or variations in the orders made by the project owner over the contractor.	GA25V SS26V MK29V EA20V M03V Ak13V MS18V La15V L10V EH16V N05V	Ak13/A N05/A La15/A L10/A Ak13/A EA20/A SS26/A MK29/A	AH17 /D
98	Changes in orders were not recorded by the contractor.	MK29V N05V M03V S04V	N05/A S04/A	
84	Additional effort was needed by the main contractor to fulfil some construction elements which were missing from the design drawing.	MG22V EA20V Y09V ST21V Ak13V	Y09/A Ak13/A	
30	The project progression or handover was over schedule (delayed).	SS24V GA25V AF28V N05V AH17V AD27V L10V	EA20/A AS24/A AH17/A AF28/A N05/A	Ak13/ D
74	A dispute arose over the project delay due to slowness in site selection and acquisition.	Ak13V	Ak13/D	
68	The contractor received a late submission of shop drawing.	MK29V		
53	The project was delayed due to the slowness of the decision-making process or bureaucracy of the client representative.	SS26V Ak13V N05V L10V AS24V	Ak13/A L10/A	M03/ D
64	The project handover was delayed due to client's hesitation or insistence on following his own interests or requirements.	MK29V		
38	Delay in the supplying of some materials led to a delay in the project handover.	SS26V Gd14V M03V		

29	The project was delayed due to a shortage of contractor labour.			
101	There was a disagreement over the payment of additional compensation to the architect agent/firm.	AD27V FH19V M03V EA20V	M03/A AD27/A	Gd14 /A
13	There was disagreement over the contractor's claims that he hadn't received some payment by the client.	HS23V GH25V AF28V M03V EM16V	HS23/A	ST21/ D
49	There was a dispute when the contractor requested additional payment to cover the overrunning of the project cost.	MG22V ST21V HS23V	ST21/A MG 22/A	
103	There was disagreement between the project owner and the contractor over method of payment.	EM16V ST21V		
97	There was a conflict between the contractor and the other project parties over interim payments.	N05V MS18V Y09V		
88	There was a conflict because the method of payment was not fully explained in the contract.	M03V HS15V EM16V N05V	EM16/A	ST21/ D
2	Late payment for the contractor.	S04V N05V HS23V EM16V ST21V	S04/A N05/A	
Commissioning and completion phase				
52	Causing a delay or deliberately creating obstacles over taking possession of the building or handover of project by the project owner or client's representative to achieve some personal gain.	H23V AD27V	HS23/ A	
107	There was a delay by the project owner during the procedure for project acceptance and handover.	La15V	La15/A	
20	An inexperienced person was involved in the project acceptance and handover process.	AK13V S04V	S04/A	
General Administration and Regulation				
16	A project owner was *non- compliant* with some of contractual obligations.	AD27V HS23V Gd14V AH17V M03V EM16V	Gd14/A AD27/A	SS26/ D

8	The contractor illegally bid rigging his full or partial contractual obligation to another contractor.	SS26V Gd14V MS18V EA20V Y09V M03V AH17V	M03/A	
71	Subcontractor . . .	AS24V M03V La15V AH17V Ak13V Y09V	Y09/A La15/A	
6	Faults or weaknesses in the contractor's classification system and how it is formulated can hinder the selection of an efficient contractor.	AF28V M03V S04V La15V AS24V SS26V AH17V EA20V MS18V Y09V	S04/A M03/A	HS23 /D
10	The lack of an effective classification system for design consultancy services agents contributes to unenlightened selection of non-qualified agents.	L10V M03V Gd14V La15V Ak13V AH17V	M03/A	

Appendix F

PO 1

The project was consisting several building for technical and vocational training to be built as well as administration department building in Amisahmah town (Riyadh region). The total area for all of buildings is 25 000M^2. The contract was based on PWC contract. The project budget was 35 million S.R. The project started in Sep 2007for two year duration.

PO2

The project is reconstructing a large building for public sector .The area was over 4000 square meters .The contractual cost was 20 million S.R. The work began in May 2007. The contractual duration was 12 months but there was a six months delay as a result of some disagreements. There was also a two million overrun over the project budget. The main role of the contractor was focused on the reconstruction works along with some infrastructure works including excavations, filling, foundations core wells and beams.

PO 3

It was a PWC contracting contract to construct a number of buildings for the municipality of Dhaba. The building area was about 800 m^2. The estimated cost was around 20 million Saudi Riyals. The project was completed with an extra cost of around 3 million Saudi Riyals. The date of commencement of the project was in November 2007 with two years a duration.

PO4

Constructing large multi -floors building to be used as headquarter court in the city of Riyadh. The project begins in January 2006 and its duration is three years, the contract was a public work contract (PWC) as Unite Price. The contractual cost for completing the contract was about 160 million S.R. No cost overrun at the time of project completion**.**

PO5

Project was a contracting contract to construct a collage for Languages and Translation at the university campus in Riyadh. It is a PWC contract with a budget of 79 million S.R. There was an increase in project cost to be in the end of the project 85 932 million S.R. it was began in December 2007 for a period of eighteen months with no delay in project delivery.

PO6

It was four 8 and 7 stars buildings as part of residential project within a university. The total area is 55000 square meters; around 70% of the project completion has been finished. It was PWC contract with total budget of 55 million S.R. It was started on 01-01-2008 with one and half year duration.

PO7

The project is a college for girls with area of 12000 square meters. The contractual value is around 60 million. It was started in August 2008 for 14 months as project duration.

PO8

The project is university in Tabuk city. Is started in March 2008 for two years duration. However, it was finished in September 2010. The contract type is PWC with budget of 450 million. However there was around 90 million overrun cost by the project completion.

PO9

The project is a headquarter building in Riyadh city. Roughly 70% percent of which has already been completed including the construction phase. PWC contract has been concluded between one of public sector organization and a contracting company. The contractual cost located was 183million S.R .However there was change orders led to the cost to be S.R193 .The project began in 7/5/2006 and was supposed to be finished within 2 years as but this duration was extended another 2 years due to some problems that occurs during construction phase .

PO10

An emergency hospital with three hundred beds in the city of Makkah to serve the pilgrims. The project in the area of two 250 square meters. A special subcontractor was involved with the main contractor for installation and implementation of the electrical and mechanical work. The project initial budget was 37 million S.R. but this amount is overrun to 54 at the completion. It is started in 20-08-2006 for two years duration but, the handover was a delayed for about 8 months.

PO11

The project was a commercial building mail with the area of 20000 square meters. The total budget is around 35 million S.R with on overrun cost. It was PWC contract the construction phase started in February 2008 for 15 months as project duration with no time extension.

PO12

It was contracting contract to construct number of buildings belong to education and training institute in the southern area of the Saudi kingdom. The budget plan was about sixteen million S.R. however by the end of the project this amount was increased one million extra .The project was contractually set to begin in

Jane 2008 for duration of 8 months however there was a 6 month delay to started the project due to delay on selection and acquisition the project site.

PO13

It was PWC re-measurement contracting contract to construct 141 medical centres over different cities in Saudi Arabia. Up to 138 centres have been completed and 3 centres expected to be completed in December 2010. The actual contractual budget was 474 millions S.R. however, it was exceeded 20 million S.R. as result of including extra items were out of initial bill of quantity. The project duration was two years started in 30-12-2004 but it was extended 4 further years due to variation orders.

PO1 4

It was contracting for a commercial building mail with the area of 12000 square meters. The contractual budget value was 50 million with no overrunning cost. It was started in April 2007 for two years duration. However, 6 months time extension also taken place.

PO15

It's a public sector project to build compartment complex in city of Hael, Saudi Arabia. The project comprises also number of some commercial facilities and government departments. The type of contract is PWC contract with main contractor .the estimated and contractual value of the project amounts 65 million S.R. Its area is 40000 square meters .It's about to finish as it was started in august 2008 and the estimated duration was 2 years.

PO16

The project was a large building in a medical complex in the city of Al-Riyadh. The contract used was PWC it was include supplying and installing aluminum works. The contractual cost was 15 million S.R. The commencement of work was in February 2006and the duration was for one year and a half.

PO 17

Constructing a headquarter building for a government establishment; the total area was about 12500M^2. The contract was PWC contracting based. The estimated cost of this project was 80 million Riyals. The date of contractual commencement of the project was in November 2006 and the contract end is in February 2009.

PO18

The project is a complex of community schools in city of Riyadh, the contract was with a PWC contract “Re-measure”. The contractual value was about 30 million S.R; the cost has increased by contract completion by about 35% above the contractual value. The date of commencement was in Nov. 2006. The duration was 30 months. But the project halted after half the period has elapsed due to disagreement between the client, the consultant and the contractor.

PO19

The project was number of institute buildings for training and teaching. It consists of teaching classes, workshops, warehouses as well as administrative buildings. The total area for all of buildings is 40 000M^2. The contract was with public sector. The estimated cost was 60 million S.R. Date of commencement was in March 2007 for two years duration.

PO 20

The project was an execution of several buildings to expand a special complex for people with special needs. The date of commencement was in Nov.2007 with two year duration .These buildings consist of several teaching and medical house also a lecture hall and a building for public administration. The entire buildings area was about 15 000 $m^{2.}$ The type of contract used was Public Works Contract (PWC) with Unite Price. The contractual project budget was 30 million S.R. The project was completed with over budget of about 3 million .There was no delay in the final delivery.

PO21

The project was a council building in Ghazla city which located in Hael region. It was about 1000 sq meter .The type of contract used for contracting was PWC with value of 80 million S.R although during the project the cost was exceeded up to extra 18 millions. The start date was in April 2006 with duration for 3 years. But the date of delivery was delayed because of some conflict occurred between the client and the contractor.

PO22

The project was a council building in Al Kharj city which located the Riyadh region. The approved early cost estimation make by the ministry of finance was 29 S.R millions. But during the tendering phase after the design drawing completed the estimation was increased up to 80 S.R millions. By the end of the project the cost exceeded around 20 millions the estimate. The contract used for the contracting was Public Work Contract (PWC). Date of contractual commencement of the project was in April 2008 and it is still under construction .

PO23

The project was constructing a number horizontal extent of buildings for an Islamic school. The type of contract was a contract between main contractor and a public sector client. The project budget was about 20 millions .S.R.; the project was completed without increase in budget. The date of project commencement was in January 2007 and for duration of one and half year.

PO24

The project is a large building of housing estate with an area of 5500 square meter, contract type was Lump Sum based on drawings, specification and contract document which are based on FIDIC contract. Contract commencement date was in June 2006 for a period of two years. There was a delay of about 11 months in project handover. The project estimated cost was 18 million S.R. but the cost overrun due to a number of change orders made by the client, also due to a dispute over interpretation of some contract documents.

PO25

The project was contracting for building a mosque in Jeddah city. It was with an area of 4500 square meters. The contract was Lump Sum with public sector. Contractual cost was 18 million .S.R; there was no increase in budget at the end of the project. Project commencement was in September 2007 for a period of 24 months and there was no delay in delivery date.

PO26

The project was an extension of a hospital in the Jubail city in the eastern region. It was three stores building with an area of 2000 square meters. The contract type was Public Work Contract (PWC) with Unite Price ends to lump Sum. Project contractual cost was 83 million .S.R. This cost increased 10% by the end of the project. Project commencement was in January 2007 for duration of two years.

PO27

The project was a seven storey hotel in the city of Al Khabr with an area around 40 000M^2. The contractual budget was 80 million S. R. the project supposed to start October 2005 but there was delay ten months due to late design approval. As a results project commencement was in July 2006 with duration of two years.

PO28

It is PWC contracting contract to build a large institution for geographical information technology. It is located in Almizahmyai (Riyadh area). The project budget is ten million and four hundred thousand Saudi Riyals. The project starts date was in June 2007 for duration of 7 months. However, the project operation was stopped by withdraw from the contractor due to a dispute between the client and the contractor.

PO29

Project is the establishment of a group of 319 residential units in city of AlJubail. The project stated in June 2009 for duration of two years. It is still running until June 2011. Contractual value is about 500 million Saudi riyals.

PO30

The project is a hotel with 12 floors and three undergrad basements in the city of Maddanh. It the building area is 1980 000 meter square. The contract type is Lum Sum contract with the budget of 82 million. The project commencement on June 2009 for thirty months duration (currently 70% is finished of the project completion)

Appendix G

Recommendations Test Survey

Abdullah M. Alshehri
School of mechanical aerospace and civil engineering
Projects management division
Room C22, George Begg Building
The University of Manchester, Manchester
M60 1QD, UK.

Please return by fax to: + 966(0) 12920808
Or by email to: mr_alshehri@hotmail.co.uk
Please return ***within two weeks of receiving***

1. Introduction

Asslam Alykum ...

This questionnaire survey is part of a current study within the field of conflict management. It aims to test some recommendations resulting from a recent programme of research in construction project management. These recommendations have been formulated within the context of a number of suggested hypotheses related to project management strategies which, if implemented, might make a significant contribution to the prevention or reduction of some of the existing causes of conflicts and disputes which may happen between parties involved in building projects.
The questionnaire contains 34 questions in all. The answers may take about 15 minutes of your valuable time, which is very much appreciated. I would be very grateful if you could answer ALL the questions, if possible, although it is acknowledged that some of the questions may not reflect the actual practice of your organization. In this case, please feel free to express your opinion by choosing what you believe is more correct, given your experience in the construction industry.

Finally, I would like to reassure you that your answers in this survey will be used for research purposes ONLY and will not be given out to any third parties of any description. Full confidentiality is guaranteed.

Abdullah Alshehri

1. **Personal information**

   1. Description of your company's main role in construction projects: (tick one below for your company) Client/ client representative [ ] Designing and consultancy [ ] main contractor [ ] Sub- contractor [ ]
   Other (e.g. *quantity surveying, arbitration*). Please specify. [ ]..

   2. How many years of experience do you have in the building construction industry?

   Less than 2 [ ]   2-4 [ ]   4-6 [ ]   6-8 [ ]   8-10[ ]

   10+ [ ]

2. <u>Questionnaire survey questions</u>

3. Clients who lack experience should involve professional client advisors/representatives during the design briefing preparation to help them to set up and transfer their needs, objectives and requirements to the architect.
   Strongly agree [ ] Agree [ ] Disagree [ ] strongly disagree [ ]

4. Clients and professionals should not pay scant attention to the project design briefing process but, should rather conduct an extensive project briefing to establish adequate information about the project aims, objectives and requirements.
   Strongly agree [ ] Agree [ ] Disagree [ ] strongly disagree [ ]

5. Any initial cost estimation at pre-design phase for a project should not determined until the preliminary design finished to use it as an important element helps to prepare more accurate estimation.
   Strongly agree [ ] agree [ ] disagree [ ] strongly

6. The project client should not delay project site selection and acquisition but rather should ensure that the selected site meets the project's objectives and requirements before bidding stage take place.
   Strongly agree [ ] agree [ ] disagree [ ] strongly disagree [ ]

7. Contractually, client and contractor should not only rely upon the geotechnical report to reveal any unforeseen subsurface site conditions but should also include clear detailed contract provisions indicates in advance how to address risk allocation and the cost associated in case different soil conditions emerged during construction phase.

   Strongly agree [ ] agree [ ] disagree [ ] strongly disagree [ ]

8. When selecting a tender from a architectural service provider, especially for large complex projects design work, the selection process should be based on the Qualifications Based Selection (QBS) method where tendered selections are based on competency rather than on the competitive method where tender selection is based on the 'lowest price wins'.

   Strongly agree [ ] agree [ ] disagree [ ] strongly disagree [ ]

9. Design and contract documents should avoid lack of data or information regarding how to utilities services can be connected. But rather should include all the requirements and the extra cost associated in these documents as results of make them available or connected.

   Strongly agree [ ] agree [ ] disagree [ ] strongly disagree [ ]

10. At the design development phase, number of regular meetings should be conducted between and within design teams and different project discipline experts such as the project manager, structural engineer, mechanical engineer, etc. to check the design solutions in advance before construction phase starts.
    Strongly agree [ ] agree [ ] disagree [ ] strongly disagree [ ]

11. There should be an early liaison between the architect and suppliers/manufacturers to check architectural design solutions for materials /machines to be installed before construction phase starts.

Strongly agree [ ] agree [ ] disagree [ ] strongly disagree [ ]

12. As clients sometimes make design change orders over architects at an advanced stage of design development or completion, the design contracts should clearly address the permitted scope of design change and the potentially extra service fees incurred should the changes stray beyond the permitted scope.

Strongly agree [ ] agree [ ] disagree [ ] strongly disagree [ ]

13. Arguable, it is sometime inevitable that when drafting design drawing, the specifications and bill of quantity, ambiguities and/or discrepancies in and between them should be found which may provokes conflicts. Therefore, there should be common construction law to address any unsolved problems associated with it.

Strongly agree [ ] agree [ ] disagree [ ] strongly disagree [ ]

14. The architect should be given realistic and adequate time to develop proper design drawings /documents.

Strongly agree [ ] agree [ ] disagree [ ] strongly disagree [ ]

15. During the tendering process, the client or project manager should perform a prequalification evaluation of the candidate contractors' tenders rather than just perform the selection based on the lowest submitted tender price.

Strongly agree [ ] agree [ ] disagree [ ] strongly disagree [ ]

16. Subcontractor(s) bidding to be involved in a project should be evaluated, selected and then approved before the construction phase starts.

Strongly agree [ ] agree [ ] disagree [ ] strongly disagree [ ]

17. As some contracts have been accused to have some deficiencies and defects such as Public Work Contract (PWC), note should be taken of the advantages of various professional international standards for the regulation of contracts.

Strongly agree [ ] agree [ ] disagree [ ] strongly disagree [ ]

18. In keeping with the traditional approach method where design phase and construction phase are separated. The designer team members should communicate with the construction site team members by attending regular meetings with them during the course of the construction process.

Strongly agree [ ] agree [ ] disagree [ ] strongly disagree [ ]

19. Contract management principles should be deployed as a key management tool, especially in large projects, by employing a specialist with relevant experience.

Strongly agree [ ] agree [ ] disagree [ ] strongly disagree [ ]

20. During the construction period, the client or project manager should, at the earliest opportunity, come to a decision regarding the possible exclusion of the contractor or the subcontractor as soon as signs of a poor level of performance and workmanship become apparent.

Strongly agree [ ] agree [ ] disagree [ ] strongly disagree [ ]

21. The client or project manager should regularly evaluate the performance of the consultant as the contractor usually gets evaluation.

Strongly agree [ ] agree [ ] disagree [ ] strongly disagree [ ]

22. The contractor should be contractually committed to forming a quality control team as part of his team members especially for large projects.

Strongly agree [ ] agree [ ] disagree [ ] strongly disagree [ ]

23. Before the construction phase starts, project team members should effectuate an early liaison with the local authority and utility company providers to ensure that the implementation of utility services is not delayed which might adversely affect the construction phase schedule.

Strongly agree [ ] agree [ ] disagree [ ] strongly disagree [ ]

24. Any verbal purchase or supply order made by one project party on behalf of the other is not valid and should be written though a submittal letter.

Strongly agree [ ] agree [ ] disagree [ ] strongly disagree [ ]

25. Any project party, especially contractors, should keep receipts and records for anything non- contractually agreed, e.g. extra costs arising out of additional time spent on change or variation orders.

Strongly agree [ ] agree [ ] disagree [ ] strongly disagree [ ]

26. Negotiation should be the preferred option for settling any disagreement or dispute.

Strongly agree [ ] agree [ ] disagree [ ] strongly disagree [ ]

27. Project parties, especially contractors, should keep a record of any reasons for delay.

Strongly agree [ ] agree [ ] disagree [ ] strongly disagree [ ]

28. As far as the method of payment concerned, it should a way that allows an interim payment to be made to the contractor to enable him or his subcontractors to supply project machine equipment during the construction process.

Strongly agree [ ] agree [ ] disagree [ ] strongly disagree [ ]

29. The method of payment or format included in any contractual document, including Public Work Contracts, should be specific and detailed.

Strongly agree [ ] agree [ ] disagree [ ] strongly disagree [ ]

30. The commissioning and completion process of project delivery should be conducted fairly by an experienced person.

Strongly agree [ ] agree [ ] disagree [ ] strongly disagree [ ]

31. Large numbers of public project tenders should not be awarded to limited numbers of contracting firm.

Strongly agree [ ] agree [ ] disagree [ ] strongly disagree [ ]

32. The Saudi law for public projects should be changed to allow the adoption of arbitration as a method of dispute settlement between government/public agents and their opposing parties as an alternative to going to litigation.

Strongly agree [ ] agree [ ] disagree [ ] strongly disagree [ ]

33. Together regulatory legislations and institutions such as an arbitration centre should be established to support the arbitration with the other alternative dispute resolution tools such as negotiation, mediation and conciliation to be most tend resolution techniques.

Strongly agree [ ] agree [ ] disagree [ ] strongly disagree [ ]

34. Do you have any further comments?[ ]yes. **If so, please write them in the box below:**

Thank you very much for your time.

أسئلة أستبيان لإختبار بعض التوصيات

السلام عليكم ورحمه الله وبركاته ...

هذا الإستبيان هو عبارة عن جزء ملحق من دراسة أقوم بها حالياً ، حيث يتضمن محتواها على إختبار لبعض التوصيات والتي تأتي في سياق طرح لبعض من الاستراتيجيات المقترحة في إدارة المشاريع على افتراض أن هذه الاستراتيجيات سوف تساهم في المنع أو الحد من ظهور أوحدوث بعض أسباب النزاعات التي ممكن أن تحدث بين الإطراف في مشاريع المباني.

الأسئلة عبارة عن 34 سؤال والإجابات قد تستغرق حوالي 15 دقيقة من وقتكم الثمين والتي ينبغي كرماً الإجابة عليها جميعها.

أرجوا ملاحظة أن هنالك بعض هذة الإسئلة قد لا تعكس واقعاً تمارسه في شركتكم أو الجهة التي تنتمون إليها ومع ذلك أرجوا أن تعبرون عن وجهة نظركم من خلال إختيار ما ترونه صواب أو أقرب إلي الصواب.

وأخيراً ، أود التأكيد بأن هذا الإستبيان سوف يستعمل لإغراض البحث فقط ونضمن لكم السرية التامة بعدم نشره للغير ... وشكراً جزيلاً

الباحث : عبدالله الشهري

جامعة مانشستر ، المملكة المتحدة

مدرسة الهندسة الميكانيكية ، الفضاء و المدنية

قسم إدارة المشاريع.

***المعلومات الشخصية :**

1. أرجوا أعطاء وصف عن دور المنظمة أو الشركة التي تعمل بها أو تنتمون إليها بالنسبة لمشاريع التشييد:(أرجوا أختيار أحد الخيارات التالية **) :**

( ) مالك (صاحب العمل)   ( ) أستشارات و تصميم   ( )   مقاول رئيسي   ( ) مقاول بالباطن

( ) آخر (مثلا محكم هندسي ، ماسح للكميات ، أ رجوا التحديد) . . . .

2. كم عدد سنوات خبرك الخاصة في صناعة التشييد ؟

( ) أقل من سنتين   ( ) 2-4   ( ) 4-6   ( ) 6-8   ( ) 8-10   ( ) أكثر من عشرة سنوات

<u>* الإجابة على أسئلة الإستبيان :</u>

3. ينبغي على المالك (صاحب العمل) الذي لا يتمتع بالخبرة الكافية لإبراز رغباتة وإحتياجاتة من المشروع أن يشرك خبير أو ممثل محترف ذو خبرة في المراحل الإولية للتصميم لمساعدتة على نقل تلك المتطلبات و الإحتياجات إلى المهندس المصمم.

( ) أتفق بشدة   ( ) أتفق   ( ) لا أتفق   ( ) لا أتفق بشدة

4. ينبغي على الملاك (صاحب العمل) و أصحاب المهنه من مصممين معماريين أن لا يؤلوا أهتماماً ضعيفاً لمرحلة التصميم المبدئية (design briefing process) بل ينبغي أن تكون هذة المرحله فاعلة و مكثفة للخروج منها بمعلومات وافية عن أهداف ومتطلبات المشروع.

( ) أتفق بشدة   ( ) أتفق   ( ) لا أتفق   ( ) لا أتفق بشدة

5. في مرحلة التخطيط ، ينبغي أن لا تقرأى ميزانية تقديرية أولية لإي مشروع الا بعد الإنتها من التصميم المبدئي . وذلك حتى يتسنى استخدام هذة الوثيقة (التصميم المبدئي) كعنصر مهم في تقدير التكلفة بدقة أكثر.

( ) أتفق بشدة   ( ) أتفق   ( ) لا أتفق   ( ) لا أتفق بشدة

6. لا ينبغي على المالك (صاحب العمل) أن يؤخر أختيار وحيازة أرض المشروع ، بل ينبغي أن تكون مختارة ومملوكة و أن يتأكد انها تتناسب مع أهداف المشروع ومتطلباتة وذلك قبل البدء بطرح المشروع لمنافسة المقاولين.

( ) أتفق بشدة   ( ) أتفق   ( ) لا أتفق   ( ) لا أتفق بشدة

7. لا ينبغي الاعتماد كليا على تقرير أختبار التربة التحت سطحية لموقع البناء في تحديد طبيعة العلاقة العقدية بين المالك والمقاول ، بل ينبغي أن يكون هناك بنود أضافية تفصل من يتحمل التبعات" المخاطرة" سواء المالية أو غيرة في حالة أن وضع التربة اختلف عن ما هو موضح في التقرير.

( ) أتفق بشدة   ( ) أتفق   ( ) لا أتفق   ( ) لا أتفق بشدة

8. عند أختيار متعهد لمشروع مأ سواءً كان مصمماً أو مقاولاً ، ينبغي أن يكون الإختيار بطريقةQBS ، والتي ترجح أختيار المتعهد ذو الكفاءة وأن لا يكون الإختيار بطريقة " السعر الإقل " والتي يرجح أختيارالمتعهد الذي يقدم العطاء (العرض) الإقل.

( ) أتفق بشدة   ( ) أتفق   ( ) لا أتفق   ( ) لا أتفق بشدة

9. ينبغي أن لا يغفل في كلاً من وثيقتي العقد والتصميم وضع البيانات الخاصة بكيفية إيجاد أو توصيل خدمات البناء التحتية (الكهرباء ، الماء ، مجرى السيول ..). بل ينبغي أن تحتويان على جميع البيانات التي توضح المتطلبات الازمة والتكاليف الإضافية من البداية حتي جعل هذة الخدمات متصلة .

( ) أتفق بشدة ( ) أتفق ( ) لا أتفق ( ) لا أتفق بشدة

10.في مرحلة متقدمة من التصميم ، ينبغي أن يكون هناك عدد من الإجتماعات الدورية ما بين فريق التصميم و الخبراء الاخرين مثل مهندس التشييد ، المكانيكا، الكهرباء وذلك للمراجعة والتأكد من أن حلول التصميم المطروحة لا يوجد بها لأى ملاحظات.

( ) أتفق بشدة ( ) أتفق ( ) لا أتفق ( ) لا أتفق بشدة

11. ينبغى أن يكون هناك تواصل بين الفريق المعماري مع الموردبين او المصنعين وذلك للتأكد من أن جميع المواد أوالأجهزة (مثل المصاعد) المراد تركيبها في المبني متناسبة مع الحلول المعمارية المقترحة .

( ) أتفق بشدة ( ) أتفق ( ) لا أتفق ( ) لا أتفق بشدة

12. لان الزبون (المالك) في بعض الإحيان ، يصدر أمر على المعماري بتغيير التصميم في مرحلة متقدمة منه أو عند أكتماله ، لذا ينبغي أن يتضن عقد التصميم بنود توضح ما هو مجال التغيير المسموح به وماهي التكلفة الإضافية في حالة أن أمر التغيير كان خارج مجال التغيير المسموح به.

( ) أتفق بشدة ( ) أتفق ( ) لا أتفق ( ) لا أتفق بشدة

13. أحياناً لا مفر من أن يتخلل الرسومات المعمارية وجدول الكميات ووثيقة الموصفات تضارب أو غموض مما قد يكون سبباً في حدوث نزاع بين الإطراف. ولمواجهة هذا النوع من النزاع المحتمل ينبغي أن يكون هناك قانون تشييد سعودي يرجع إليه لحسم النزاعات العالقة والمرافقة لهذة المشكلة.

( ) أتفق بشدة ( ) أتفق ( ) لا أتفق ( ) لا أتفق بشدة

14. ينبغي أن يعطي المصمم المعماري وقت منطقي وكافي لتطوير الرسومات المعمارية أو وثيقة التصميم بشكل جيد.

( ) أتفق بشدة ( ) أتفق ( ) لا أتفق ( ) لا أتفق بشدة

15. ينبغي خلال عملية المناقصة أن يتم القيام بإجراء أختبار كفاءة(pre-qualification) للمقاولين المرشحين بالفوز بالمناقصة وعدم الإكتفاء فقط بأختيار سعرالعطاء(عرض الأسعار) الأقل.

( ) أتفق بشدة ( ) أتفق ( ) لا أتفق ( ) لا أتفق بشدة

16. ينبغي قبل الشروع في مرحلة التشييد أن يتم إجراء طرح مناقصة لإختيار المقاول بالباطن وأن يتم كذلك تقييمة وأختياره.

( ) أتفق بشدة ( ) أتفق ( ) لا أتفق ( ) لا أتفق بشدة

17. بما أن هناك بعض الإنتقادات على بعض العقود مثل عقد الإشغال العامة لكونه يتخللها بعض أوجة القصور أوالعيوب ، فإنه ينبغي أن يستفاد من بعض معايير العقود العالمية الإخري في صياغة وتنظيم عقود أكثر نضجاً.

( ) أتفق بشدة ( ) أتفق ( ) لا أتفق ( ) لا أتفق بشدة

18. في الطريقة " التصميم ثم التنفيذ " المسماة بـ(Traditional method) وهي الطريقة التي يكون فيها مرحلة التصميم منفصلة عن مرحلة التشييد ، ينبغي أن يكون هناك تواصل بين فريقي التصميم و التشييد في الموقع عن طريق عقد أجتماعات منتظمة خلال عملية البناء.

( ) أتفق بشدة ( ) أتفق ( ) لا أتفق ( ) لا أتفق بشدة

19. ينبغي تطبيق مبادئ إدارة العقود، خاصة في المشاريع الكبيرة، عن طريق تعيين شخص ذو دراية أو خبرة بتلك المبادئ الإدارية.

( ) أتفق بشدة ( ) أتفق ( ) لا أتفق ( ) لا أتفق بشدة

20. ينبغي على المالك(صاحب العمل) أو مدير المشروع إتخاذ قرار باستبعاد المقاول أو المقاول بالبطن في أقرب فرصة أذا رأى منهما علامات واضحة تدل على ضعف الأداء أو جودة العمل.

( ) أتفق بشدة ( ) أتفق ( ) لا أتفق ( ) لا أتفق بشدة

21. كما أن هناك تقييم على أداء المقاول ينبغي أن يكون هناك أيضاً تقييم على أداء الاستشاري المشرف الذي يعمل معه في نفس المشروع .

( ) أتفق بشدة ( ) أتفق ( ) لا أتفق ( ) لا أتفق بشدة

22. ينبغي أن يكون هناك ألتزام عقدي على المقاول أثناء تنفيذه للمشاريع بأن يكون هناك فريق خاص بضبط الجودة ، خاصة في المشاريع الكبيرة.

( ) أتفق بشدة ( ) أتفق ( ) لا أتفق ( ) لا أتفق بشدة

23. قبل بدء مرحلة التشييد ، ينبغي أن يكون هناك تواصل مع الشركات المزودة لخدمات البناء التحتية(الكهرباء، الماء ...)، للتأكد من أن هذة الخدمات ستجهز في وقتها المحدد وبما لا يؤثر على جدول المشروع.

( ) أتفق بشدة ( ) أتفق ( ) لا أتفق ( ) لا أتفق بشدة

24. أى أمرشفوي بشراء أو توريد صادرمن أحد أطراف المشروع إلى الآخر لا ينبغي الأخذ به الا أذا كان صادراً بشكل رسالة خطية مكتوبه.

( ) أتفق بشدة ( ) أتفق ( ) لا أتفق ( ) لا أتفق بشدة

25.ينبغي لأي ى طرف من أطراف المشروع خاصة المقاول أن يحتفظ بسجلات وفواتير أي شيئ غيرمنصوص علية عقدياً ، مثال بعض التكاليف الإضافية للاحقة التي أتت كنتيجة من أوامر التغيير.

( ) أتفق بشدة ( ) أتفق ( ) لا أتفق ( ) لا أتفق بشدة

26. ينبغي أن يكون التفاوض هو الخيار المفضل لتسوية الخلافات أو النزاعات بين الأطراف.

( ) أتفق بشدة ( ) أتفق ( ) لا أتفق ( ) لا أتفق بشدة

27. ينبغي على المقاول أن يوثق أي سبب من أسباب تأخر المشروع.

( ) أتفق بشدة ( ) أتفق ( ) لا أتفق ( ) لا أتفق بشدة

28. بالنسبة لطريقة الدفع ، ينبغي أن يتم السماح بإجراء دفعات مؤقتة للمقاول أو المقاول بالباطن لجعلهما قادرين على توريد أجهزة ومعدات المشروع خلال عملية التشييد.

( ) أتفق بشدة ( ) أتفق ( ) لا أتفق ( ) لا أتفق بشدة

29. ينبغي أن تكون طريقة الدفع في العقود ومن ضمنها عقد الإشغال العامة محددة ومفصلة.

( ) أتفق بشدة ( ) أتفق ( ) لا أتفق ( ) لا أتفق بشدة

30. ينبغي أن تتم إجراءات عملية القبول والتسليم عند اكتمال االمشروع بشكل عادل وبواسطة شخص خبير ذو كفاءة.

( ) أتفق بشدة ( ) أتفق ( ) لا أتفق ( ) لا أتفق بشدة

31. لا ينبغي أن يتم إسناد عدد كبير من المناقصات الحكومية لعدد محدود من شركات المقاولات.

( ) أتفق بشدة ( ) أتفق ( ) لا أتفق ( ) لا أتفق بشدة

32. ينبغي تغيير القانون السعودي المتعلق بالمشاريع الحكومية بأن يتم السماح للتحكيم كوسيلة لتسوية النزاع بين الطرف الحكومي ونظيره من القطاع الخاص كبديل عن اللجوء إلى القضاء .

( ) أتفق بشدة ( ) أتفق ( ) لا أتفق ( ) لا أتفق بشدة

33. ينبغي إنشاء تشريعات قانونية وأحداث مراكز (أو معاهد) ، مثل مراكز التحكيم التي تدعم وتشجع التحكيم كوسيلة لتسوية النزاعات وكذلك الوسائل الإخرى البديلة، مثل المفاوضات ، الوساطة ، الصلح، لتكون أكثر الوسائل إنتشاراً من حيث الممارسة.

( ) أتفق بشدة ( ) أتفق ( ) لا أتفق ( ) لا أتفق بشدة

34. هل يوجد لدية أى تعليق أضافي ؟( ) أذا كان الإجابة بنعم ، أرجوا كتابته في المربع بالاسفل:

شكراً جزيلاً على وقتك
أرجو منك أرسال جميع أوراق الإستبيان على رقم الفاكس:
+ 966(0) 12920808

Appendix H

Responses Distribution Obtained from Recommendations Test Survey

Clients/ Client representatives (total 77) : Responses to recommendations 1 to 7

		Recom1	Recom2	Recom3	Recom4	Recom5	Recom 6	Recom7
Number of Responses	S. agree	55	59	24	60	23	48	50
	Agree	21	15	38	13	38	22	23
	Disagree	1	0	13	2	12	5	3
	S. disagree	0	3	2	2	4	2	1
Number of Responses %	S. agree	71	77	31	78	30	62	65
	Agree	27	19	49	17	49	29	30
	Disagree	1	0	17	3	16	6	4
	S. disagree	0	4	3	3	5	3	1
Number of Responses *0.1	S. agree	7	8	3	8	3	6	6
	Agree	3	2	5	2	5	3	3
	Disagree	0	0	2	0	2	1	0
	S. disagree	0	0	0	0	1	0	0
Weighted Mean		37.01298701	36.88312	30.90909	37.01299	30.38961	35.06494	35.84416
	100%	10	10	10	10	10	10	10
Results		3.70	3.69	3.09	3.70	3.04	3.51	3.58

Design & Consultant (total 93) : Responses to Recommendations 1 to 7

Number of Responses	S. agree	58	66	38	65	35	55	58
	Agree	28	24	39	23	38	32	34
	S. agree	7	2	15	5	17	5	1
	Agree	0	1	1	0	3	1	0
Number of Responses %	S. agree	62.3655914	70.96774	40.86022	69.89247	37.63441	59.13978	62.36559
	Agree	30.10752688	25.80645	41.93548	24.73118	40.86022	34.4086	36.55914
	Disagree	7.52688172	2.150538	16.12903	5.376344	18.27957	5.376344	1.075269
	S. disagree	0	1.075269	1.075269	0	3.225806	1.075269	0
Number of Responses *0.1	S. agree	6.23655914	7.096774	4.086022	6.989247	3.763441	5.913978	6.236559
	Agree	3.010752688	2.580645	4.193548	2.473118	4.086022	3.44086	3.655914
	Disagree	0.752688172	0.215054	1.612903	0.537634	1.827957	0.537634	0.107527
	S. disagree	0	0.107527	0.107527	0	0.322581	0.107527	0
Weighted Mean		35.48387097	36.66667	32.25806	36.45161	31.29032	35.16129	36.12903
		10	10	10	10	10	10	10
Results		3.55	3.67	3.23	3.65	3.13	3.52	3.61

Main Contractors (total of 109): Responses to Recommendations 1 to 7

		Recom1	Recom2	Recom3	Recom4	Recom5	Recom 6	Recom7
Number of Responses	S. agree							
	Agree	68	75	51	64	37	52	50
	Disagree	41	30	39	40	57	42	54
	S. disagree	0	2	14	5	11	15	4
		0	2	5	0	4	0	1
Number of Responses %		68	75	51	64	37	52	50
	S. agree	62.3853211	68.80734	46.78899	58.7156	33.94495	47.70642	45.87156
	Agree	37.6146789	27.52294	35.77982	36.69725	52.29358	38.53211	49.54128
	Disagree	0	1.834862	12.84404	4.587156	10.09174	13.76147	3.669725
	S. disagree	0	1.834862	4.587156	0	3.669725	0	0.917431
Number of Responses *0.1	S. agree	6.23853211	6.880734	4.678899	5.87156	3.394495	4.770642	4.587156
	Agree	3.76146789	2.752294	3.577982	3.669725	5.229358	3.853211	4.954128
	Disagree	0	0.183486	1.284404	0.458716	1.009174	1.376147	0.366972
	S. disagree	0	0.183486	0.458716	0	0.366972	0	0.091743
Weighted Mean		36.23853211	36.33028	32.47706	35.41284	31.65138	33.3945	34.0367
	100%	10	10	10	10	10	10	10
Results		3.62	3.63	3.25	3.54	3.17	3.34	3.40

Sub- Contractors (total of 16): Responses to Recommendations 1 to 7

Number of Responses	S. agree	15	12	5	12	8	10	8
	Agree	1	4	7	3	7	5	7
	S. agree	0	0	4	1	1	1	1
	Agree	0	0	0	0	0	0	0
Number of Responses %	S. agree	93.75	75	31.25	75	50	62.5	50
	Agree	6.25	25	43.75	18.75	43.75	31.25	43.75
	Disagree	0	0	25	6.25	6.25	6.25	6.25
	S. disagree	0	0	0	0	0	0	0
Number of Responses *0.1	S. agree	9.375	7.5	3.125	7.5	5	6.25	5
	Agree	0.625	2.5	4.375	1.875	4.375	3.125	4.375
	Disagree	0	0	2.5	0.625	0.625	0.625	0.625
	S. disagree	0	0	0	0	0	0	0
Weighted Mean		39.375	37.5	30.625	36.875	34.375	35.625	34.375
	100%	10	10	10	10	10	10	10
Results		3.9375	3.75	3.0625	3.6875	3.4375	3.5625	3.4375

Others (total of 15): Responses to Recommendations 1 to 7

		Recom1	Recom2	Recom3	Recom4	Recom5	Recom 6	Recom7
Number of Responses	S. agree	11	9	4	11	5	9	9
	Agree	3	5	6	4	10	5	5
	Disagree	1	1	5	0	0	1	1
	S. disagree	0	0	0	0	0	0	0
Number of Responses %	S. agree	73.33333333	60	26.66667	73.33333	33.33333	60	60
	Agree	20	33.33333	40	26.66667	66.66667	33.33333	33.33333
	Disagree	6.666666667	6.666667	33.33333	0	0	6.666667	6.666667
	S. disagree	0	0	0	0	0	0	0
Number of Responses *0.1	S. agree	7.333333333	6	2.666667	7.333333	3.333333	6	6
	Agree	2	3.333333	4	2.666667	6.666667	3.333333	3.333333
	Disagree	0.666666667	0.666667	3.333333	0	0	0.666667	0.666667
	S. disagree	0	0	0	0	0	0	0
Weighted Mean		37	35	29	37	33	35	35
	100%	10	10	10	10	10	10	10
Results		3.67	3.53	2.93	3.73	3.33	3.53	3.53

Clients/ Client representatives (total 77) : Responses to recommendations 8 to 16

		Recom8	Recom9	Recom10	Recom11	Recom12	Recom 13	Recom14	Recom 15	Recom16
Number of Responses	S. agree	55	42	44	42	34	51	30	40	32
	Agree	19	31	24	32	40	25	26	35	41
	Disagree	2	3	9	3	1	1	21	1	3
	S. disagree	1	1	0	0	2	0	0	1	1
		55	42	44	42	34	51	30	40	32
Number of Responses %	S. agree	71	55	57	55	44	66	39	52	42
	Agree	25	40	31	42	52	32	34	45	53
	Disagree	3	4	12	4	1	1	27	1	4
	S. disagree	1	1	0	0	3	0	0	1	1
Number of Responses *0.1	S. agree	7	5	6	5	4	7	4	5	4
	Agree	2	4	3	4	5	3	3	5	5
	Disagree	0	0	1	0	0	0	3	0	0
	S. disagree	0	0	0	0	0	0	0	0	0
	Weighted Mean	36.62338	34.80519	34.54545	35.06494		33.76623	36.49351	31.16883	34.80519
	100%	10	10	10	10	10	10	10	10	10
	Results	3.66	3.48	3.45	3.51	3.38	3.65	3.12	3.48	3.35

Design & Consultant (total 93) : Responses to Recommendations 8 to 16

		Recom8	Recom9	Recom10	Recom11	Recom12	Recom 13	Recom14	Recom 15	Recom16
Number of Responses	S. agree	65	50	60	57	67	64	35	45	50
	Agree	26	37	26	30	25	26	36	45	35
	S. agree	1	5	5	6	1	3	21	2	6
	Agree	1	1	2	0	0	0	1	1	2
Number of Responses %	S. agree	69.89247	53.76344	64.51613	61.29032	72.04301	68.8172	37.63441	48.3871	53.76344
	Agree	27.95699	39.78495	27.95699	32.25806	26.88172	27.95699	38.70968	48.3871	37.63441
	Disagree	1.075269	5.376344	5.376344	6.451613	1.075269	3.225806	22.58065	2.150538	6.451613
	S. disagree	1.075269	1.075269	2.150538	0	0	0	1.075269	1.075269	2.150538
Number of Responses *0.1	S. agree	6.989247	5.376344	6.451613	6.129032	7.204301	6.88172	3.763441	4.83871	5.376344
	Agree	2.795699	3.978495	2.795699	3.225806	2.688172	2.795699	3.870968	4.83871	3.763441
	Disagree	0.107527	0.537634	0.537634	0.645161	0.107527	0.322581	2.258065	0.215054	0.645161
	S. disagree	0.107527	0.107527	0.215054	0	0	0	0.107527	0.107527	0.215054
	Weighted Mean	36.66667	34.62366	35.48387	35.48387	37.09677	36.55914	31.29032	34.4086	34.30108
	100%	10	10	10	10	10	10	10	10	10
	Results	3.67	3.46	3.55	3.55	3.71	3.66	3.13	3.44	3.43

Main Contractors (total of 109): Responses to Recommendations 8 to 16

		Recom8	Recom9	Recom10	Recom11	Recom12	Recom 13	Recom14	Recom 15	Recom16
Number of Responses	S. agree									
	Agree	71	60	56	50	64	66	36	42	60
	Disagree	32	41	42	51	42	36	46	63	42
	S. disagree	6	7	10	7	2	7	23	4	7
		0	1	1	1	1	0	4	0	0
		71	60	56	50	64	66	36	42	60
Number of Responses %	S. agree	65.13761	55.04587	51.37615	45.87156	58.7156	60.5504	33.02752	38.53211	55.04587
	Agree	29.3578	37.61468	38.53211	46.7889	38.53211	33.0275	42.20183	57.79817	38.53211
	Disagree	5.504587	6.422018	9.174312	6.422018	1.834862	6.422018	21.10092	3.669725	6.422018
	S. disagree	0	0.917431	0.917431	0.917431	0.917431	0	3.669725	0	0
Number of Responses *0.1	S. agree	6.513761	5.504587	5.137615	4.587156	5.87156	6.055046	3.302752	3.853211	5.504587
	Agree	2.93578	3.761468	3.853211	4.678899	3.853211	3.302752	4.220183	5.779817	3.853211
	Disagree	0.550459	0.642202	0.917431	0.642202	0.183486	0.642202	2.110092	0.366972	0.642202
	S. disagree	0	0.091743	0.091743	0.091743	0.091743	0	0.366972	0	0
Weighted Mean										
	100%	10	10	10	10	10	10	10	10	10
Results		3.60	3.47	3.40	3.38	3.55	3.54	3.05	3.35	3.49

Sub- Contractors (total of 16): Responses to Recommendations 8 to 16

Number of Responses	S. agree	13	6	10	8	8	9	9	5	5
	Agree	3	8	6	6	8	7	5	8	11
	S. agree	0	2	0	2	0	0	2	3	0
	Agree	0	0	0	0	0	0	0	0	0
		13	6	10	8	8	9	9	5	5
Number of Responses %	S. agree	81.25	37.5	62.5	50	50	56.25	56.25	31.25	31.25
	Agree	18.75	50	37.5	37.5	50	43.75	31.25	50	68.75
	Disagree	0	12.5	0	12.5	0	0	12.5	18.75	0
	S. disagree	0	0	0	0	0	0	0	0	0
Number of Responses *0.1	S. agree	8.125	3.75	6.25	5	5	5.625	5.625	3.125	3.125
	Agree	1.875	5	3.75	3.75	5	4.375	3.125	5	6.875
	Disagree	0	1.25	0	1.25	0	0	1.25	1.875	0
	S. disagree	0	0	0	0	0	0	0	0	0
Weighted Mean		38.125	32.5	36.25	33.75	35	35.625	34.375	31.25	33.125
	100%	10	10	10	10	10	10	10	10	10
Results		3.8125	3.25	3.625	3.375	3.5	3.5625	3.4375	3.125	3.3125

Others (total of 15): Responses to Recommendations 8 to 16

		Recom8	Recom9	Recom10	Recom11	Recom12	Recom 13	Recom14	Recom 15	Recom16
Number of Responses	S. agree	13	4	7	12	9	10	6	8	3
	Agree	2	10	7	3	6	5	5	4	9
	Disagree	0	1	1	0	0	0	4	3	3
	S. disagree	0	0	0	0	0	0	0	0	0
Number of Responses %	S. agree	86.66	26.66	46.666	80	60	66.66	40	53.33	20
	Agree	13.333	66.66	46.666	20	40	33.333	33.33	26.6	60
	Disagree	0	6.666	6.666	0	0	0	26.66	20	20
	S. disagree	0	0	0	0	0	0	0	0	0
Number of Responses *0.1	S. agree	8.666	2.666	4.666	8	6	6.666	4	5.333	2
	Agree	1.333	6.666	4.66	2	4	3.333	3.333	2.66	6
	Disagree	0	0.666	0.66	0	0	0	2.666	2	2
	S. disagree	0	0	0	0	0	0	0	0	0
	Weighted Mean	39	32	34	38	36	37	31	33	30 39
	100%	10	10	10	10	10	10	10	10	10
	Results	3.87	3.20	3.40	3.80	3.60	3.67	3.13	3.33	3.0

Clients/ Client representatives (total 77) : Responses to recommendations 17 to 25

		Recom17	Recom18	Recom19	Recom20	Recom21	Recom 22	Recom23	Recom 24	Recom25
Number of Responses	S. agree	46	37	52	58	45	45	45	35	50
	Agree	29	31	23	17	30	28	25	37	25
	Disagree	1	9	0	2	2	4	6	5	2
	S. disagree	1	0	2	0	0	0	1	0	0
Number of Responses %	S. agree	60	48	68	75	58	58	58	45	65
	Agree	38	40	30	22	39	36	32	48	32
	Disagree	1	12	0	3	3	5	8	6	3
	S. disagree	1	0	3	0	0	0	1	0	0
Number of Responses *0.1	S. agree	6	5	7	8	6	6	6	5	6
	Agree	4	4	3	2	4	4	3	5	3
	Disagree	0	1	0	0	0	1	1	1	0
	S. disagree	0	0	0	0	0	0	0	0	0
Weighted Mean		35.58442	33.63636	36.23377	37.27273	35.58442	35.32468	34.80519		33.8961
	100%	10	10	10	10	10	10	10	10	10
Results		3.56	3.36	3.62	3.73	3.56	3.53	3.48	3.39	3.62

Design & Consultant (total 93) : Responses to Recommendations 17 to 25

		Recom17	Recom18	Recom19	Recom20	Recom21	Recom 22	Recom23	Recom 24	Recom25
Number of Responses	S. agree	57	52	51	64	59	65	58	47	68
	Agree	34	34	39	28	31	22	32	39	25
	Disagree	2	7	3	1	3	6	3	7	0
	S. disagree	0	0	0	0	0	0	0	0	0
Number of Responses %	S. agree	61.29032	55.91398	54.83871	68.8172	63.44086	69.89247	62.36559	50.53763	73.11828
	Agree	36.55914	36.55914	41.93548	30.10753	33.33333	23.65591	34.4086	41.93548	26.88172
	Disagree	2.150538	7.526882	3.225806	1.075269	3.225806	6.451613	3.225806	7.526882	0
	S. disagree	0	0	0	0	0	0	0	0	0
Number of Responses *0.1	S. agree	6.129032	5.591398	5.483871	6.88172	6.344086	6.989247	6.236559	5.053763	7.311828
	Agree	3.655914	3.655914	4.193548	3.010753	3.333333	2.365591	3.44086	4.193548	2.688172
	Disagree	0.215054	0.752688	0.322581	0.107527	0.322581	0.645161	0.322581	0.752688	0
	S. disagree	0	0	0	0	0	0	0	0	0
Weighted Mean		35.91398	34.83871	35.16129	36.77419	36.02151	36.34409	35.91398	34.30108	37.31183
	100%	10	10	10	10	10	10	10	10	10
Results		3.59	3.48	3.52	3.68	3.60	3.63	3.59	3.43	3.73

Main Contractors (total of 109): Responses to Recommendations 17 to 25

		Recom17	Recom18	Recom19	Recom20	Recom21	Recom 22	Recom23	Recom 24	Recom25
Number of Responses	S. agree	57	38	70	66	55	70	63	57	83
	Agree	47	56	36	40	44	35	43	45	24
	Disagree	5	14	1	2	6	4	3	6	1
	S. disagree	0	1	2	1	4	0	0	1	1
Number of Responses %	S. agree	52.29358	34.86239	64.22018	60.55046	50.45872	64.22018	57.79817	52.29358	76.14679
	Agree	43.11927	51.37615	33.02752	36.69725	40.36697	32.11009	39.44954	41.2844	22.01835
	Disagree	4.587156	12.84404	0.917431	1.834862	5.504587	3.669725	2.752294	5.504587	0.917431
	S. disagree	0	0.917431	1.834862	0.917431	3.669725	0	0	0.917431	0.917431
Number of Responses *0.1	S. agree	5.229358	3.486239	6.422018	6.055046	5.045872	6.422018	5.779817	5.229358	7.614679
	Agree	4.311927	5.137615	3.302752	3.669725	4.036697	3.211009	3.944954	4.12844	2.201835
	Disagree	0.458716	1.284404	0.091743	0.183486	0.550459	0.366972	0.275229	0.550459	0.091743
	S. disagree	0	0.091743	0.183486	0.091743	0.366972	0	0	0.091743	0.091743
Weighted Mean		34.77064	32.01835	35.9633	35.68807	33.76147	36.05505	35.50459	34.49541	37.33945
	100%	10	10	10	10	10	10	10	10	10
Results		3.48	3.20	3.60	3.57	3.38	3.61	3.55	3.45	3.73
									3.48	3.20

Sub- Contractors (total of 16): Responses to Recommendations 17 to 25

Number of Responses	S. agree	10	6	10	8	5	13	10	5	12
	Agree	6	6	6	8	10	3	6	10	4
	S. agree	0	4	0	0	1	0	0	1	0
	Agree	0	0	0	0	0	0	0	0	0
Number of Responses %	S. agree	62.5	37.5	62.5	50	31.25	81.25	62.5	31.25	75
	Agree	37.5	37.5	37.5	50	62.5	18.75	37.5	62.5	25
	Disagree	0	25	0	0	6.25	0	0	6.25	0
	S. disagree	0	0	0	0	0	0	0	0	0
Number of Responses *0.1	S. agree	6.25	3.75	6.25	5	3.125	8.125	6.25	3.125	7.5
	Agree	3.75	3.75	3.75	5	6.25	1.875	3.75	6.25	2.5
	Disagree	0	2.5	0	0	0.625	0	0	0.625	0
	S. disagree	0	0	0	0	0	0	0	0	0
Weighted Mean		36.25	31.25	36.25	35	32.5	38.125	36.25	32.5	37.5
	100%	10	10	10	10	10	10	10	10	10
Results		3.625	3.125	3.625	3.5	3.25	3.8125	3.625	3.25	3.75

Others (total of 15): Responses to Recommendations 17 to 25

		Recom17	Recom18	Recom19	Recom20	Recom21	Recom 22	Recom23	Recom 24	Recom25
Number of Responses	S. agree	10	11	11	12	13	11	11	10	13
	Agree	5	3	4	3	2	4	4	3	2
	Disagree	0	1	0	0	0	0	0	2	0
	S. disagree	0	0	0	0	0	0	0	0	0
Number of Responses %	S. agree	66.66	73.333	73.3333	80	86.666	73.33	73.33	66.66	86.66
	Agree	33.33	20	26.66	20	13.33	26.666	26.66	20	13.3
	Disagree	0	6.666	0	0	0	0	0	13.33	0
	S. disagree	0	0	0	0	0	0	0	0	0
Number of Responses *0.1	S. agree	6.666	7.333333	7.3333	8	8.66	7.333	7.33	6.666	8.6
	Agree		3.333333	2	2.66	2	1.33	2.666	2.667	2
	Disagree		0	0.66	0	0	0	0	0	1.333
	S. disagree		0	0	0	0	0	0	0	0
	Weighted Mean	37	37	37	38	39	37	37	35	39 37
	100%	10	10	10	10	10	10	10	10	10
	Results	3.67	3.67	3.73	3.80	3.87	3.73	3.73	3.53	3.87

Clients/ Client representatives (total 77) : Responses to recommendations 26 to 31

		Recom26	Recom27	Recom28	Recom29	Recom30	Recom 31	
Number of Responses	S. agree	30	43	49	44	31	34	
	Agree	40	31	27	27	40	41	
	Disagree	7	3	1	5	4	2	
	S. disagree	0	0	0	1	2	0	
Number of Responses %	S. agree	39	56	64	57	40	44	
	Agree	52	40	35	35	52	53	
	Disagree	9	4	1	6	5	3	
	S. disagree	0	0	0	1	3	0	
Number of Responses *0.1	S. agree	4	6	6	6	4	4	
	Agree	5	4	4	4	5	5	
	Disagree	1	0	0	1	1	0	
	S. disagree	0	0	0	0	0	0	
Weighted Mean		32.98701	35.19481	36.23377	34.80519	32.98701	34.15584	
	100%	10	10	10	10	10	10	
Results		3.30	3.52	3.62	3.48	3.30	3.42	**107.88**
					Average = 3.480101			
Number of Responses	S. agree	38	64	67	62	50	50	
	Agree	48	26	25	23	36	40	
	S. agree	5	3	1	6	6	3	
	Agree	2	0	0	2	1	0	
Number of Responses %	S. agree	40.86022	68.8172	72.04301	66.66667	53.76344	53.76344	
	Agree	51.6129	27.95699	26.88172	24.73118	38.70968	43.01075	
	Disagree	5.376344	3.225806	1.075269	6.451613	6.451613	3.225806	
	S. disagree	2.150538	0	0	2.150538	1.075269	0	
Number of Responses *0.1	S. agree	4.086022	6.88172	7.204301	6.666667	5.376344	5.376344	
	Agree	5.16129	2.795699	2.688172	2.473118	3.870968	4.301075	
	Disagree	0.537634	0.322581	0.107527	0.645161	0.645161	0.322581	
	S. disagree	0.215054	0	0	0.215054	0.107527	0	
		4.086022	6.88172	7.204301	6.666667	5.376344	5.376344	
Weighted Mean		33.11828	36.55914	37.09677	35.5914	34.51613	35.05376	
		10	10	10	10	10	10	
Results		3.31	3.66	3.71	3.56	3.45	3.51	**109.39**
					Average =3.528616			

Main Contractors (total of 109): Responses to recommendations 26 to 31

		Recom26	Recom27	Recom28	Recom29	Recom30	Recom 31	
Number of Responses	S. agree	69	69	64	67	48	42	
	Agree	36	38	40	33	51	60	
	Disagree	3	1	4	6	10	6	
	S. disagree	1	1	1	3	0	1	
Number of Responses %	S. agree	63.30275	63.30275	58.7156	61.46789	44.0367	38.53211	
	Agree	33.02752	34.86239	36.69725	30.27523	46.78899	55.04587	
	Disagree	2.752294	0.917431	3.669725	5.504587	9.174312	5.504587	
	S. disagree							
Number of Responses *0.1	S. agree	6.330275	6.330275	5.87156	6.146789	4.40367	3.853211	
	Agree	3.302752	3.486239	3.669725	3.027523	4.678899	5.504587	
	Disagree	0.275229	0.091743	0.366972	0.550459	0.917431	0.550459	
	S. disagree	0.091743	0.091743	0.091743	0.275229	0	0.091743	
Weighted Mean		35.87156	36.05505	35.3211	35.04587	33.48624	33.11927	
	100%	10	10	10	10	10	10	
Results		3.59	3.61	3.53	3.50	3.35	3.31	**107.22**
				Average =3.458716				

Sub- Contractors (total of 16): Responses to recommendations 26 to 31

Number of Responses	S. agree	10	9	12	14	8	6	
	Agree	5	7	4	2	7	9	
	S. agree	1	0	0	0	1	1	
	Agree	0	0	0	0	0	0	
Number of Responses %	S. agree	62.5	56.25	75	87.5	50	37.5	
	Agree	31.25	43.75	25	12.5	43.75	56.25	
	Disagree	6.25	0	0	0	6.25	6.25	
	S. disagree	0	0	0	0	0	0	
Number of Responses *0.1	S. agree	6.25	5.625	7.5	8.75	5	3.75	
	Agree	3.125	4.375	2.5	1.25	4.375	5.625	
	Disagree	0.625	0	0	0	0.625	0.625	
	S. disagree	0	0	0	0	0	0	
Weighted Mean		35.625	35.625	37.5	38.75	34.375	33.125	
	100%	10	10	10	10	10	10	
Results		3.5625	3.5625	3.75	3.875	3.4375	3.3125	**108.9375**
				Average =3.514113				

Others (total of 15): Responses to recommendations 26 to 31

		Recom26	Recom27	Recom28	Recom29	Recom30	Recom 31	
Number of Responses	S. agree	5	10	10	11	11	9	
	Agree	7	5	4	4	1	6	
	Disagree	2	0	1	0	3	0	
	S. disagree	1	0	0	0	0	0	
Number of Responses %	S. agree	33.33	66.666	66.66	73.33	73.333	60	
	Agree	46.6	33.33	26.66	26.666	6.666	40	
	Disagree	13.33	0	6.66	0	20	0	
	S. disagree	6.66	0	0	0	0	0	
Number of Responses *0.1	S. agree	3.333	6.666	6.666	7.3333	7.333	6	
	Agree	4.666	3.333	2.666	2.666	0.6	4	
	Disagree	1.333	0	0.66	0	2	0	
	S. disagree	0.666	0	0	0	0	0	
Weighted Mean		31	37	36	37	35	36	
	100%	10	10	10	10	10	10	
Results		31	37	36	37	35	36	**110.07**

Average =3.550538

Overall Average= 3.51

Appendix I

Details of the SPSS Results to Project Management Recommendations

Crosstabs

Details of the SPSS Results to Recommendation Number 1:

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Group * Recom1	310	100.0%	0	.0%	310	100.0%

Group * Recom1 Cross tabulation

			Recom1			
			D	A	S. A.	Total
Group	Client	Count	1	21	55	77
		% within Group	1.3%	27.3%	71.4%	100.0%
	Design	Count	7	28	58	93
		% within Group	7.5%	30.1%	62.4%	100.0%
	Maincontractor	Count	0	41	68	109
		% within Group	.0%	37.6%	62.4%	100.0%
	Subcontractor	Count	0	1	15	16
		% within Group	.0%	6.2%	93.8%	100.0%
	Other	Count	1	3	11	15
		% within Group	6.7%	20.0%	73.3%	100.0%
	Total	Count	9	94	207	310
		% within Group	2.9%	30.3%	66.8%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	20.301[a]	8	.009	.015		
Likelihood Ratio	23.039	8	.003	.004		
Fisher's Exact Test	18.999			.008		
Linear-by-Linear Association	.191[b]	1	.662	.691	.351	.036
N of Valid Cases	310					

% 7 cells (46.7%) have expected count less than 5. The minimum expected count is .44.

% The standardized statistic is .437.

Crosstabs

Details of the SPSS Results to Recommendation Number 2:

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Group * Recom2	310	100.0%	0	.0%	310	100.0%

Group * Recom2 Cross tabulation

			Recom2				
			S. D.	D	A	S. A.	Total
Group	Client	Count	3	0	15	59	77
		% within Group	3.9%	.0%	19.5%	76.6%	100.0%
	Design	Count	1	2	24	66	93
		% within Group	1.1%	2.2%	25.8%	71.0%	100.0%
	Maincontractor	Count	2	2	30	75	109
		% within Group	1.8%	1.8%	27.5%	68.8%	100.0%
	Subcontractor	Count	0	0	4	12	16
		% within Group	.0%	.0%	25.0%	75.0%	100.0%
	Other	Count	0	1	5	9	15
		% within Group	.0%	6.7%	33.3%	60.0%	100.0%
	Total	Count	6	5	78	221	310
		% within Group	1.9%	1.6%	25.2%	71.3%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	8.911[a]	12	.711	.696		
Likelihood Ratio	9.706	12	.642	.700		
						.02
Fisher's Exact Test	8.516			.697		
Linear-by-Linear Association	.460[b]	1	.498	.511	.261	
N of Valid Cases	310					

% 12 cells (60.0%) have expected count less than 5. The minimum expected count is .24.

% The standardized statistic is -.678.

Crosstabs

Details of the SPSS Results to Recommendation Number 4:

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Group * Recom4	310	100.0%	0	.0%	310	100.0%

Group * Recom4 Cross tabulation

			Recom4				
			S. D.	D	A	S. A.	Total
Group	Client	Count	2	2	13	60	77
		% within Group	2.6%	2.6%	16.9%	77.9%	100.0%
	Design	Count	0	5	23	65	93
		% within Group	.0%	5.4%	24.7%	69.9%	100.0%
	Maincontractor	Count	0	5	40	64	109
		% within Group	.0%	4.6%	36.7%	58.7%	100.0%
	Subcontractor	Count	0	1	3	12	16
		% within Group	.0%	6.2%	18.8%	75.0%	100.0%
	Other	Count	0	0	4	11	15
		% within Group	.0%	.0%	26.7%	73.3%	100.0%
	Total	Count	2	13	83	212	310
		% within Group	.6%	4.2%	26.8%	68.4%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	17.714[a]	12	.125	.138		
Likelihood Ratio	17.974	12	.116	.096		.026
Fisher's Exact Test	16.372			.116		
Linear-by-Linear Association	.593[b]	1	.441	.446	.234	
N of Valid Cases	310					

a. 12 cells (60.0%) have expected count less than 5. The minimum expected count is .10.

b. The standardized statistic is -.770.

Crosstabs

Details of the SPSS Results to Recommendation Number 5:

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Group * Recom5	310	100.0%	0	.0%	310	100.0%

Group * Recom5 Cross tabulation

			Recom5				
			S. D.	D	A	S. A.	Total
Group	Client	Count	4	12	38	23	77
		% within Group	5.2%	15.6%	49.4%	29.9%	100.0%
	Design	Count	3	17	38	35	93
		% within Group	3.2%	18.3%	40.9%	37.6%	100.0%
	Maincontractor	Count	4	11	57	37	109
		% within Group	3.7%	10.1%	52.3%	33.9%	100.0%
	Subcontractor	Count	0	1	7	8	16
		% within Group	.0%	6.2%	43.8%	50.0%	100.0%
	Other	Count	0	0	10	5	15
		% within Group	.0%	.0%	66.7%	33.3%	100.0%
	Total	Count	11	41	150	108	310
		% within Group	3.5%	13.2%	48.4%	34.8%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	11.621[a]	12	.477	.[b]	
Likelihood Ratio	14.479	12	.271	.[b]	
Fisher's Exact Test	.[b]			.[b]	
Linear-by-Linear Association	3.795	1	.051	.[b]	.[b]
N of Valid Cases	310				

a. 7 cells (35.0%) have expected count less than 5. The minimum expected count is .53.

b. Cannot be computed because there is insufficient memory.

Crosstabs

Details of the SPSS Results to Recommendation Number 6:

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Group * Recom6	310	100.0%	0	.0%	310	100.0%

Group * Recom6 Cross tabulation

			Recom6				
			S. D.	D	A	S. A.	Total
Group	Client	Count	2	5	22	48	77
		% within Group	2.6%	6.5%	28.6%	62.3%	100.0%
	Design	Count	1	5	32	55	93
		% within Group	1.1%	5.4%	34.4%	59.1%	100.0%
	Maincontractor	Count	0	15	42	52	109
		% within Group	.0%	13.8%	38.5%	47.7%	100.0%
	Subcontractor	Count	0	1	5	10	16
		% within Group	.0%	6.2%	31.2%	62.5%	100.0%
	Other	Count	0	1	5	9	15
		% within Group	.0%	6.7%	33.3%	60.0%	100.0%
	Total	Count	3	27	106	174	310
		% within Group	1.0%	8.7%	34.2%	56.1%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	12.046[a]	12	.442	.[b]	
Likelihood Ratio	12.562	12	.402	.[b]	
Fisher's Exact Test	11.649			.423	
Linear-by-Linear Association	.549	1	.459	.[b]	.[b]
N of Valid Cases	310				

a. 7 cells (35.0%) have expected count less than 5. The minimum expected count is .15.

b. Cannot be computed because there is insufficient memory.

Crosstabs

Details of the SPSS Results to Recommendation Number 7:

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Group * Recom7	310	100.0%	0	.0%	310	100.0%

Group * Recom7 Cross tabulation

			Recom7				
			S. D.	D	A	S. A.	Total
Group	Client	Count	1	3	23	50	77
		% within Group	1.3%	3.9%	29.9%	64.9%	100.0%
	Design	Count	0	1	34	58	93
		% within Group	.0%	1.1%	36.6%	62.4%	100.0%
	Maincontractor	Count	1	4	54	50	109
		% within Group	.9%	3.7%	49.5%	45.9%	100.0%
	Subcontractor	Count	0	1	7	8	16
		% within Group	.0%	6.2%	43.8%	50.0%	100.0%
	Other	Count	0	1	5	9	15
		% within Group	.0%	6.7%	33.3%	60.0%	100.0%
	Total	Count	2	10	123	175	310
		% within Group	.6%	3.2%	39.7%	56.5%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	12.803[a]	12	.383	.384		
Likelihood Ratio	13.782	12	.315	.291		
Fisher's Exact Test	15.696			.142		
Linear-by-Linear Association	3.133[b]	1	.077	.078	.043	.008
N of Valid Cases	310					

a. 10 cells (50.0%) have expected count less than 5. The minimum expected count is .10.

b. The standardized statistic is -1.770.

Crosstabs

Details of the SPSS Results to Recommendation Number 8:

Group * Recom8 Cross tabulation

			Recom8				
			S. D.	D	A	S. A.	Total
Group	Client	Count	1	2	19	55	77
		% within Group	1.3%	2.6%	24.7%	71.4%	100.0%
	Design	Count	1	1	26	65	93
		% within Group	1.1%	1.1%	28.0%	69.9%	100.0%
	Maincontractor	Count	0	6	32	71	109
		% within Group	.0%	5.5%	29.4%	65.1%	100.0%
	Subcontractor	Count	0	0	3	13	16
		% within Group	.0%	.0%	18.8%	81.2%	100.0%
	Other	Count	0	0	2	13	15
		% within Group	.0%	.0%	13.3%	86.7%	100.0%
	Total	Count	2	9	82	217	310
		% within Group	.6%	2.9%	26.5%	70.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	9.345[a]	12	.673	.633		
Likelihood Ratio	10.997	12	.529	.534		
Fisher's Exact Test	9.138			.695		
Linear-by-Linear Association	.472[b]	1	.492	.509	.263	.03
N of Valid Cases	310					

a. 12 cells (60.0%) have expected count less than 5. The minimum expected count is .10.

b. The standardized statistic is .687.

Crosstabs

Details of the SPSS Results to Recommendation Number 9:

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Group * Recom9	310	100.0%	0	.0%	310	100.0%

Group * Recom9 Cross tabulation

			Recom9				
			S. D.	D	A	S. A.	Total
Group	Client	Count	1	3	31	42	77
		% within Group	1.3%	3.9%	40.3%	54.5%	100.0%
	Design	Count	1	5	37	50	93
		% within Group	1.1%	5.4%	39.8%	53.8%	100.0%
	Maincontractor	Count	1	7	41	60	109
		% within Group	.9%	6.4%	37.6%	55.0%	100.0%
	Subcontractor	Count	0	2	8	6	16
		% within Group	.0%	12.5%	50.0%	37.5%	100.0%
	Other	Count	0	1	10	4	15
		% within Group	.0%	6.7%	66.7%	26.7%	100.0%
	Total	Count	3	18	127	162	310
		% within Group	1.0%	5.8%	41.0%	52.3%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	8.143[a]	12	.774	.763	
Likelihood Ratio	8.269	12	.764	.826	
Fisher's Exact Test	9.818			.595	
Linear-by-Linear Association	2.096	1	.148	.[b]	.[b]
N of Valid Cases	310				

a. 8 cells (40.0%) have expected count less than 5. The minimum expected count is .15.

b. Cannot be computed because there is insufficient memory.

Crosstabs

Details of the SPSS Results to Recommendation Number 10:

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Group * Recom10	310	100.0%	0	.0%	310	100.0%

Group * Recom10 Cross tabulation

			Recom10				
			S. D.	D	A	S. A.	Total
Group	Client	Count	0	9	24	44	77
		% within Group	.0%	11.7%	31.2%	57.1%	100.0%
	Design	Count	2	5	30	56	93
		% within Group	2.2%	5.4%	32.3%	60.2%	100.0%
	Maincontractor	Count	1	10	42	56	109
		% within Group	.9%	9.2%	38.5%	51.4%	100.0%
	Subcontractor	Count	0	0	6	10	16
		% within Group	.0%	.0%	37.5%	62.5%	100.0%
	Other	Count	0	1	7	7	15
		% within Group	.0%	6.7%	46.7%	46.7%	100.0%
	Total	Count	3	25	109	173	310
		% within Group	1.0%	8.1%	35.2%	55.8%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	8.571[a]	12	.739	.730	
Likelihood Ratio	10.476	12	.574	.630	
Fisher's Exact Test	8.295			.764	
Linear-by-Linear Association	.053	1	.818	.[b]	.[b]
N of Valid Cases	310				

a. 7 cells (35.0%) have expected count less than 5. The minimum expected count is .15.

b. Cannot be computed because there is insufficient memory.

Crosstabs

Details of the SPSS Results to Recommendation Number 11:

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Group * Recom11	310	100.0%	0	.0%	310	100.0%

Group * Recom11 Cross tabulation

			Recom11				
			S. D.	D	A	S. A.	Total
Group	Client	Count	0	3	32	42	77
		% within Group	.0%	3.9%	41.6%	54.5%	100.0%
	Design	Count	0	6	30	57	93
		% within Group	.0%	6.5%	32.3%	61.3%	100.0%
	Maincontractor	Count	1	7	51	50	109
		% within Group	.9%	6.4%	46.8%	45.9%	100.0%
	Subcontractor	Count	0	2	6	8	16
		% within Group	.0%	12.5%	37.5%	50.0%	100.0%
	Other	Count	0	0	3	12	15
		% within Group	.0%	.0%	20.0%	80.0%	100.0%
	Total	Count	1	18	122	169	310
		% within Group	.3%	5.8%	39.4%	54.5%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	12.953[a]	12	.372	.300		
Likelihood Ratio	13.956	12	.304	.227		
Fisher's Exact Test	14.952			.241		
Linear-by-Linear Association	.043[b]	1	.836	.863	.434	.034
N of Valid Cases	310					

a. 8 cells (40.0%) have expected count less than 5. The minimum expected count is .05.

b. The standardized statistic is -.207.

Crosstabs

Details of the SPSS Results to Recommendation Number 12:

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Group * Recom12	310	100.0%	0	.0%	310	100.0%

Group * Recom12 Cross tabulation

			Recom12				
			S. D.	D	A	S. A.	Total
Group	Client	Count	2	1	40	34	77
		% within Group	2.6%	1.3%	51.9%	44.2%	100.0%
	Design	Count	0	1	25	67	93
		% within Group	.0%	1.1%	26.9%	72.0%	100.0%
	Maincontractor	Count	1	2	42	64	109
		% within Group	.9%	1.8%	38.5%	58.7%	100.0%
	Subcontractor	Count	0	0	8	8	16
		% within Group	.0%	.0%	50.0%	50.0%	100.0%
	Other	Count	0	0	6	9	15
		% within Group	.0%	.0%	40.0%	60.0%	100.0%
	Total	Count	3	4	121	182	310
		% within Group	1.0%	1.3%	39.0%	58.7%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	17.117[a]	12	.145	.138		
Likelihood Ratio	18.181	12	.110	.084		
Fisher's Exact Test	17.814			.059		
Linear-by-Linear Association	1.589[b]	1	.207	.209	.112	.017
N of Valid Cases	310					

a. 10 cells (50.0%) have expected count less than 5. The minimum expected count is .15.

b. The standardized statistic is 1.261.

Crosstabs

Details of the SPSS Results to Recommendation Number 13:

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Group * Recom13	310	100.0%	0	.0%	310	100.0%

Group * Recom13 Cross tabulation

			Recom13			
			D	A	S. A.	Total
Group	Client	Count	1	25	51	77
		% within Group	1.3%	32.5%	66.2%	100.0%
	Design	Count	3	26	64	93
		% within Group	3.2%	28.0%	68.8%	100.0%
	Maincontractor	Count	7	36	66	109
		% within Group	6.4%	33.0%	60.6%	100.0%
	Subcontractor	Count	0	7	9	16
		% within Group	.0%	43.8%	56.2%	100.0%
	Other	Count	0	5	10	15
		% within Group	.0%	33.3%	66.7%	100.0%
	Total	Count	11	99	200	310
		% within Group	3.5%	31.9%	64.5%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	6.727[a]	8	.566	.563		
Likelihood Ratio	7.642	8	.469	.511		
Fisher's Exact Test	5.169			.703		
Linear-by-Linear Association	.832[b]	1	.362	.386	.194	.025
N of Valid Cases	310					

a. 6 cells (40.0%) have expected count less than 5. The minimum expected count is .53.

b. The standardized statistic is -.912.

Crosstabs

Details of the SPSS Results to Recommendation Number 14:

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Group * Recom14	310	100.0%	0	.0%	310	100.0%

Group * Recom14 Cross tabulation

			Recom14				
			S. D.	D	A	S. A.	Total
Group	Client	Count	0	21	26	30	77
		% within Group	.0%	27.3%	33.8%	39.0%	100.0%
	Design	Count	1	21	36	35	93
		% within Group	1.1%	22.6%	38.7%	37.6%	100.0%
	Maincontractor	Count	4	23	46	36	109
		% within Group	3.7%	21.1%	42.2%	33.0%	100.0%
	Subcontractor	Count	0	2	5	9	16
		% within Group	.0%	12.5%	31.2%	56.2%	100.0%
	Other	Count	0	4	5	6	15
		% within Group	.0%	26.7%	33.3%	40.0%	100.0%
	Total	Count	5	71	118	116	310
		% within Group	1.6%	22.9%	38.1%	37.4%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	9.729[a]	12	.640	.[b]	
Likelihood Ratio	10.672	12	.557	.[b]	
Fisher's Exact Test	8.252			.752	
Linear-by-Linear Association	.060	1	.807	.[b]	.[b]
N of Valid Cases	310				

a. 7 cells (35.0%) have expected count less than 5. The minimum expected count is .24.

b. Cannot be computed because there is insufficient memory.

Crosstabs

Details of the SPSS Results to Recommendation Number17:

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Group * Recom17	310	100.0%	0	.0%	310	100.0%

Group * Recom17 Cross tabulation

			Recom17				
			S. D.	D	A	S. A.	Total
Group	Client	Count	1	1	29	46	77
		% within Group	1.3%	1.3%	37.7%	59.7%	100.0%
	Design	Count	0	2	34	57	93
		% within Group	.0%	2.2%	36.6%	61.3%	100.0%
	Maincontractor	Count	0	5	47	57	109
		% within Group	.0%	4.6%	43.1%	52.3%	100.0%
	Subcontractor	Count	0	0	6	10	16
		% within Group	.0%	.0%	37.5%	62.5%	100.0%
	Other	Count	0	0	5	10	15
		% within Group	.0%	.0%	33.3%	66.7%	100.0%
	Total	Count	1	8	121	180	310
		% within Group	.3%	2.6%	39.0%	58.1%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	7.942[a]	12	.790	.713		
Likelihood Ratio	8.296	12	.762	.727		
Fisher's Exact Test	8.780			.846		
Linear-by-Linear Association	.005[b]	1	.941	.962	.488	.038
N of Valid Cases	310					

a. 10 cells (50.0%) have expected count less than 5. The minimum expected count is .05.

b. The standardized statistic is -.074.

Crosstabs

Details of the SPSS Results to Recommendation Number 19:

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Group * Recom19	310	100.0%	0	.0%	310	100.0%

Group * Recom19 Cross tabulation

			Recom19				
			S. D.	D	A	S. A.	Total
Group	Client	Count	2	0	23	52	77
		% within Group	2.6%	.0%	29.9%	67.5%	100.0%
	Design	Count	0	4	38	51	93
		% within Group	.0%	4.3%	40.9%	54.8%	100.0%
	Maincontractor	Count	2	1	36	70	109
		% within Group	1.8%	.9%	33.0%	64.2%	100.0%
	Subcontractor	Count	0	0	1	15	16
		% within Group	.0%	.0%	6.2%	93.8%	100.0%
	Other	Count	0	1	3	11	15
		% within Group	.0%	6.7%	20.0%	73.3%	100.0%
	Total	Count	4	6	101	199	310
		% within Group	1.3%	1.9%	32.6%	64.2%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	19.722[a]	12	.073	.[b]		
Likelihood Ratio	23.096	12	.027	.[b]		
Fisher's Exact Test	19.179			0		
Linear-by-Linear Association	1.151[c]	1	.283	.303	.152	.021
N of Valid Cases	310					

a. 11 cells (55.0%) have expected count less than 5. The minimum expected count is .19.

b. Cannot be computed because there is insufficient memory.

c. The standardized statistic is 1.073.

Crosstabs

Details of the SPSS Results to Recommendation Number 20:

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Group * Recom20	310	100.0%	0	.0%	310	100.0%

Group * Recom20 Cross tabulation

			Recom20				
			S. D.	D	A	S. A.	Total
Group	Client	Count	0	2	17	58	77
		% within Group	.0%	2.6%	22.1%	75.3%	100.0%
	Design	Count	0	1	28	64	93
		% within Group	.0%	1.1%	30.1%	68.8%	100.0%
	Maincontractor	Count	1	2	40	66	109
		% within Group	.9%	1.8%	36.7%	60.6%	100.0%
	Subcontractor	Count	0	0	8	8	16
		% within Group	.0%	.0%	50.0%	50.0%	100.0%
	Other	Count	0	0	3	12	15
		% within Group	.0%	.0%	20.0%	80.0%	100.0%
	Total	Count	1	5	96	208	310
		% within Group	.3%	1.6%	31.0%	67.1%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	11.187[a]	12	.513	.400		
Likelihood Ratio	11.865	12	.457	.364		
Fisher's Exact Test	13.615			.333		
Linear-by-Linear Association	1.652[b]	1	.199	.205	.109	.018
N of Valid Cases	310					

a. 12 cells (60.0%) have expected count less than 5. The minimum expected count is .05.

b. The standardized statistic is -1.285.

Crosstabs

Details of the SPSS Results to Recommendation Number 22:

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Group * Recom22	310	100.0%	0	.0%	310	100.0%

Group * Recom22 Cross tabulation

			Recom22			
			D	A	S. A.	Total
Group	Client	Count	4	28	45	77
		% within Group	5.2%	36.4%	58.4%	100.0%
	Design	Count	6	22	65	93
		% within Group	6.5%	23.7%	69.9%	100.0%
	Maincontractor	Count	4	35	70	109
		% within Group	3.7%	32.1%	64.2%	100.0%
	Subcontractor	Count	0	3	13	16
		% within Group	.0%	18.8%	81.2%	100.0%
	Other	Count	0	4	11	15
		% within Group	.0%	26.7%	73.3%	100.0%
	Total	Count	14	92	204	310
		% within Group	4.5%	29.7%	65.8%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	7.247[a]	8	.510	.504		
Likelihood Ratio	8.641	8	.374	.417		
Fisher's Exact Test	5.915			.616		
Linear-by-Linear Association	2.595[b]	1	.107	.111	.058	.010
N of Valid Cases	310					

a. 7 cells (46.7%) have expected count less than 5. The minimum expected count is .68.

b. The standardized statistic is 1.611.

Crosstabs

Details of the SPSS Results to Recommendation Number 23:

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Group * Recom23	310	100.0%	0	.0%	310	100.0%

Group * Recom23 Cross tabulation

			Recom23				
			S. D.	D	A	S. A.	Total
Group	Client	Count	1	6	25	45	77
		% within Group	1.3%	7.8%	32.5%	58.4%	100.0%
	Design	Count	0	3	32	58	93
		% within Group	.0%	3.2%	34.4%	62.4%	100.0%
	Maincontractor	Count	0	3	43	63	109
		% within Group	.0%	2.8%	39.4%	57.8%	100.0%
	Subcontractor	Count	0	0	6	10	16
		% within Group	.0%	.0%	37.5%	62.5%	100.0%
	Other	Count	0	0	4	11	15
		% within Group	.0%	.0%	26.7%	73.3%	100.0%
	Total	Count	1	12	110	187	310
		% within Group	.3%	3.9%	35.5%	60.3%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	9.453[a]	12	.664	.569		
Likelihood Ratio	9.750	12	.638	.586		
Fisher's Exact Test	9.724			.749		
Linear-by-Linear Association	1.927[b]	1	.165	.170	.089	.014
N of Valid Cases	310					

a. 10 cells (50.0%) have expected count less than 5. The minimum expected count is .05.

b. The standardized statistic is 1.388.

Crosstabs

Details of the SPSS Results to Recommendation Number 24:

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Group * Recom24	310	100.0%	0	.0%	310	100.0%

Group * Recom24 Cross tabulation

			Recom24				
			S. D.	D	A	S. A.	Total
Group	Client	Count	0	5	37	35	77
		% within Group	.0%	6.5%	48.1%	45.5%	100.0%
	Design	Count	0	7	40	46	93
		% within Group	.0%	7.5%	43.0%	49.5%	100.0%
	Maincontractor	Count	1	6	45	57	109
		% within Group	.9%	5.5%	41.3%	52.3%	100.0%
	Subcontractor	Count	0	1	10	5	16
		% within Group	.0%	6.2%	62.5%	31.2%	100.0%
	Other	Count	0	2	3	10	15
		% within Group	.0%	13.3%	20.0%	66.7%	100.0%
	Total	Count	1	21	135	153	310
		% within Group	.3%	6.8%	43.5%	49.4%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	9.274[a]	12	.679	.592		
Likelihood Ratio	9.714	12	.641	.603		
Fisher's Exact Test	12.325			.475		
Linear-by-Linear Association	.202[b]	1	.653	.672	.343	.031
N of Valid Cases	310					

a. 7 cells (35.0%) have expected count less than 5. The minimum expected count is .05.

b. The standardized statistic is .449.

Crosstabs

Details of the SPSS Results to Recommendation Number 25:

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Group * Recom25	310	100.0%	0	.0%	310	100.0%

Group * Recom25 Cross tabulation

			Recom25				
			S. D.	D	A	S. A.	Total
Group	Client	Count	0	2	25	50	77
		% within Group	.0%	2.6%	32.5%	64.9%	100.0%
	Design	Count	0	0	25	68	93
		% within Group	.0%	.0%	26.9%	73.1%	100.0%
	Maincontractor	Count	1	1	24	83	109
		% within Group	.9%	.9%	22.0%	76.1%	100.0%
	Subcontractor	Count	0	0	4	12	16
		% within Group	.0%	.0%	25.0%	75.0%	100.0%
	Other	Count	0	0	2	13	15
		% within Group	.0%	.0%	13.3%	86.7%	100.0%
	Total	Count	1	3	80	226	310
		% within Group	.3%	1.0%	25.8%	72.9%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	9.268[a]	12	.680	.588		
Likelihood Ratio	10.168	12	.601	.508		
Fisher's Exact Test	11.663			.567		
Linear-by-Linear Association	3.533[b]	1	.060	.064	.032	.007
N of Valid Cases	310					

a. 12 cells (60.0%) have expected count less than 5. The minimum expected count is .05.

b. The standardized statistic is 1.880.

Crosstabs

Details of the SPSS Results to Recommendation Number 27:

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Group * Recom27	310	100.0%	0	.0%	310	100.0%

Group * Recom27 Cross tabulation

			Recom27				
			S. D.	D	A	S. A.	Total
Group	Client	Count	0	3	31	43	77
		% within Group	.0%	3.9%	40.3%	55.8%	100.0%
	Design	Count	0	3	26	64	93
		% within Group	.0%	3.2%	28.0%	68.8%	100.0%
	Maincontractor	Count	1	1	38	69	109
		% within Group	.9%	.9%	34.9%	63.3%	100.0%
	Subcontractor	Count	0	0	7	9	16
		% within Group	.0%	.0%	43.8%	56.2%	100.0%
	Other	Count	0	0	5	10	15
		% within Group	.0%	.0%	33.3%	66.7%	100.0%
	Total	Count	1	7	107	195	310
		% within Group	.3%	2.3%	34.5%	62.9%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	8.289[a]	12	.762	.677		
Likelihood Ratio	9.303	12	.677	.621		
Fisher's Exact Test	10.429			.672		
Linear-by-Linear Association	.698[b]	1	.403	.410	.217	.028
N of Valid Cases	310					

a. 10 cells (50.0%) have expected count less than 5. The minimum expected count is .05.

b. The standardized statistic is .836.

Crosstabs

Details of the SPSS Results to Recommendation Number 28:

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Group * Recom28	310	100.0%	0	.0%	310	100.0%

Group * Recom28 Cross tabulation

			Recom28				
			S. D.	D	A	S. A.	Total
Group	Client	Count	0	1	27	49	77
		% within Group	.0%	1.3%	35.1%	63.6%	100.0%
	Design	Count	0	1	25	67	93
		% within Group	.0%	1.1%	26.9%	72.0%	100.0%
	Maincontractor	Count	1	4	40	64	109
		% within Group	.9%	3.7%	36.7%	58.7%	100.0%
	Subcontractor	Count	0	0	4	12	16
		% within Group	.0%	.0%	25.0%	75.0%	100.0%
	Other	Count	0	1	4	10	15
		% within Group	.0%	6.7%	26.7%	66.7%	100.0%
	Total	Count	1	7	100	202	310
		% within Group	.3%	2.3%	32.3%	65.2%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	9.084[a]	12	.696	.593		
Likelihood Ratio	9.324	12	.675	.619		
Fisher's Exact Test	11.396			.562		
Linear-by-Linear Association	.452[b]	1	.501	.525	.266	.031
N of Valid Cases	310					

a. 11 cells (55.0%) have expected count less than 5. The minimum expected count is .05.

b. The standardized statistic is -.672.

Crosstabs

Details of the SPSS Results to Recommendation Number 29:

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Group * Recom29	310	100.0%	0	.0%	310	100.0%

Group * Recom29 Cross tabulation

			Recom29				
			S. D.	D	A	S. A.	Total
Group	Client	Count	1	5	27	44	77
		% within Group	1.3%	6.5%	35.1%	57.1%	100.0%
	Design	Count	2	6	23	62	93
		% within Group	2.2%	6.5%	24.7%	66.7%	100.0%
	Maincontractor	Count	3	6	33	67	109
		% within Group	2.8%	5.5%	30.3%	61.5%	100.0%
	Subcontractor	Count	0	0	2	14	16
		% within Group	.0%	.0%	12.5%	87.5%	100.0%
	Other	Count	0	0	4	11	15
		% within Group	.0%	.0%	26.7%	73.3%	100.0%
	Total	Count	6	17	89	198	310
		% within Group	1.9%	5.5%	28.7%	63.9%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	8.703[a]	12	.728	.[b]	
Likelihood Ratio	11.176	12	.514	.588	
Fisher's Exact Test	6.999			.832	
Linear-by-Linear Association	2.326	1	.127	.[b]	.[b]
N of Valid Cases	310				

a. 10 cells (50.0%) have expected count less than 5. The minimum expected count is .29.

b. Cannot be computed because there is insufficient memory.

Crosstabs

Details of the SPSS Results to Recommendation Number 31:

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Group * Recom31	310	100.0%	0	.0%	310	100.0%

Group * Recom31 Cross tabulation

			Recom31				
			S. D.	D	A	S. A.	Total
Group	Client	Count	0	2	41	34	77
		% within Group	.0%	2.6%	53.2%	44.2%	100.0%
	Design	Count	0	3	40	50	93
		% within Group	.0%	3.2%	43.0%	53.8%	100.0%
	Maincontractor	Count	1	6	60	42	109
		% within Group	.9%	5.5%	55.0%	38.5%	100.0%
	Subcontractor	Count	0	1	9	6	16
		% within Group	.0%	6.2%	56.2%	37.5%	100.0%
	Other	Count	0	0	6	9	15
		% within Group	.0%	.0%	40.0%	60.0%	100.0%
	Total	Count	1	12	156	141	310
		% within Group	.3%	3.9%	50.3%	45.5%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	9.373[a]	12	.671	.577		
Likelihood Ratio	10.115	12	.606	.546		
Fisher's Exact Test	11.682			.529		
Linear-by-Linear Association	.272[b]	1	.602	.613	.317	.032
N of Valid Cases	310					

a. 10 cells (50.0%) have expected count less than 5. The minimum expected count is .05.

b. The standardized statistic is -.521.

Crosstabs

Details of the SPSS Results to Recommendation Number 3:

Group * Recom 3 new Cross tabulation

			Recom3new		
			Disagree	Agree	Total
Group	Client	Count	15	62	77
		% within Group	19.5%	80.5%	100.0%
	Design	Count	16	77	93
		% within Group	17.2%	82.8%	100.0%
	Maincontractor	Count	19	90	109
		% within Group	17.4%	82.6%	100.0%
	Subcontractor	Count	4	12	16
		% within Group	25.0%	75.0%	100.0%
	Other	Count	5	10	15
		% within Group	33.3%	66.7%	100.0%
	Total	Count	59	251	310
		% within Group	19.0%	81.0%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	2.754[a]	4	.600	.605		
Likelihood Ratio	2.464	4	.651	.674		
Fisher's Exact Test	3.009			.553		
Linear-by-Linear Association	.730[b]	1	.393	.413	.215	.037
N of Valid Cases	310					

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is 2.85.

b. The standardized statistic is -.854.

Crosstabs

Details of the SPSS Results to Recommendation Number 5:

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Group * Recom5new	310	100.0%	0	.0%	310	100.0%

Group * Recom5 Cross tabulation

			Recom5new		
			Disagree	Agree	Total
Group	Client	Count	16	61	77
		% within Group	20.8%	79.2%	100.0%
	Design	Count	20	73	93
		% within Group	21.5%	78.5%	100.0%
	Maincontractor	Count	15	94	109
		% within Group	13.8%	86.2%	100.0%
	Subcontractor	Count	1	15	16
		% within Group	6.2%	93.8%	100.0%
	Other	Count	0	15	15
		% within Group	.0%	100.0%	100.0%
	Total	Count	52	258	310
		% within Group	16.8%	83.2%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	7.377[a]	4	.117	.112		
Likelihood Ratio	10.080	4	.039	.049		
Fisher's Exact Test	7.018			.120		
Linear-by-Linear Association	6.153[b]	1	.013	.014	.007	.002
N of Valid Cases	310					

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is 2.52.

b. The standardized statistic is 2.480.

Crosstabs

Details of the SPSS Results to Recommendation Number 15:

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Group * Recom15new	310	100.0%	0	.0%	310	100.0%

Group * Recom15new Cross tabulation

			Recom15new		
			Disagree	Agree	Total
Group	Client	Count	2	75	77
		% within Group	2.6%	97.4%	100.0%
	Design	Count	3	90	93
		% within Group	3.2%	96.8%	100.0%
	Maincontractor	Count	4	105	109
		% within Group	3.7%	96.3%	100.0%
	Subcontractor	Count	3	13	16
		% within Group	18.8%	81.2%	100.0%
	Other	Count	3	12	15
		% within Group	20.0%	80.0%	100.0%
	Total	Count	15	295	310
		% within Group	4.8%	95.2%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	15.902[a]	4	.003	.008		
Likelihood Ratio	10.315	4	.035	.037		
Fisher's Exact Test	11.790			.010		
Linear-by-Linear Association	8.586[b]	1	.003	.004	.003	.002
N of Valid Cases	310					

a. 4 cells (40.0%) have expected count less than 5. The minimum expected count is .73.

b. The standardized statistic is -2.930.

Crosstabs

Details of the SPSS Results to Recommendation Number 16:

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Group * Recom16new	310	100.0%	0	.0%	310	100.0%

Group * Recom16 Cross tabulation

			Recom16new		
			Disagree	Agree	Total
Group	Client	Count	4	73	77
		% within Group	5.2%	94.8%	100.0%
	Design	Count	8	85	93
		% within Group	8.6%	91.4%	100.0%
	Maincontractor	Count	7	102	109
		% within Group	6.4%	93.6%	100.0%
	Subcontractor	Count	0	16	16
		% within Group	.0%	100.0%	100.0%
	Other	Count	3	12	15
		% within Group	20.0%	80.0%	100.0%
	Total	Count	22	288	310
		% within Group	7.1%	92.9%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	5.828[a]	4	.212	.195		
Likelihood Ratio	5.825	4	.213	.254		
Fisher's Exact Test	4.749			.263		
Linear-by-Linear Association	.793[b]	1	.373	.404	.214	.054
N of Valid Cases	310					

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is 1.06.

b. The standardized statistic is -.891.

Crosstabs

Details of the SPSS Results to Recommendation Number 18:

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Group * Recom18new	310	100.0%	0	.0%	310	100.0%

Group * Recom18new Cross tabulation

			Recom18new		
			Disagree	Agree	Total
Group	Client	Count	9	68	77
		% within Group	11.7%	88.3%	100.0%
	Design	Count	8	85	93
		% within Group	8.6%	91.4%	100.0%
	Maincontractor	Count	15	94	109
		% within Group	13.8%	86.2%	100.0%
	Subcontractor	Count	0	16	16
		% within Group	.0%	100.0%	100.0%
	Other	Count	1	14	15
		% within Group	6.7%	93.3%	100.0%
	Total	Count	33	277	310
		% within Group	10.6%	89.4%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	3.765[a]	4	.439	.437		
Likelihood Ratio	5.434	4	.246	.302		
Fisher's Exact Test	3.073			.526		
Linear-by-Linear Association	.205[b]	1	.651	.666	.362	.063
N of Valid Cases	310					

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is 1.60.

b. The standardized statistic is .453.

Crosstabs

Details of the SPSS Results to Recommendation Number 21:

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Group * Recom21new	310	100.0%	0	.0%	310	100.0%

Group * Recom21 Cross tabulation

			Recom21new		
			Disagree	Agree	Total
Group	Client	Count	2	75	77
		% within Group	2.6%	97.4%	100.0%
	Design	Count	3	90	93
		% within Group	3.2%	96.8%	100.0%
	Maincontractor	Count	10	99	109
		% within Group	9.2%	90.8%	100.0%
	Subcontractor	Count	1	15	16
		% within Group	6.2%	93.8%	100.0%
	Other	Count	0	15	15
		% within Group	.0%	100.0%	100.0%
	Total	Count	16	294	310
		% within Group	5.2%	94.8%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	6.187[a]	4	.186	.191		
Likelihood Ratio	6.641	4	.156	.169		
Fisher's Exact Test	5.021			.229		
Linear-by-Linear Association	1.124[b]	1	.289	.332	.173	.053
N of Valid Cases	310					

a. 4 cells (40.0%) have expected count less than 5. The minimum expected count is .77.

b. The standardized statistic is -1.060.

Crosstabs

Details of the SPSS Results to Recommendation Number 26:

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Group * Recom26new	310	100.0%	0	.0%	310	100.0%

Group * Recom26 Cross tabulation

			Recom26new		
			Disagree	Agree	Total
Group	Client	Count	7	70	77
		% within Group	9.1%	90.9%	100.0%
	Design	Count	7	86	93
		% within Group	7.5%	92.5%	100.0%
	Maincontractor	Count	4	105	109
		% within Group	3.7%	96.3%	100.0%
	Subcontractor	Count	1	15	16
		% within Group	6.2%	93.8%	100.0%
	Other	Count	3	12	15
		% within Group	20.0%	80.0%	100.0%
	Total	Count	22	288	310
		% within Group	7.1%	92.9%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	
Pearson Chi-Square	6.237[a]	4	.182	.162		
Likelihood Ratio	5.432	4	.246	.292		
Fisher's Exact Test	6.160			.144		
Linear-by-Linear Association	.003[b]	1	.956	1.000	.513	
N of Valid Cases	310					

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is 1.06.

b. The standardized statistic is -.055.

Crosstabs

Details of the SPSS Results to Recommendation Number 30:

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Group * Recom30new	310	100.0%	0	.0%	310	100.0%

Group * Recom30 Cross tabulation

			Recom30new		
			Disagree	Agree	Total
Group	Client	Count	6	71	77
		% within Group	7.8%	92.2%	100.0%
	Design	Count	7	86	93
		% within Group	7.5%	92.5%	100.0%
	Maincontractor	Count	10	99	109
		% within Group	9.2%	90.8%	100.0%
	Subcontractor	Count	1	15	16
		% within Group	6.2%	93.8%	100.0%
	Other	Count	3	12	15
		% within Group	20.0%	80.0%	100.0%
	Total	Count	27	283	310
		% within Group	8.7%	91.3%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)	Point Probability
Pearson Chi-Square	2.801[a]	4	.592	.602		
Likelihood Ratio	2.237	4	.692	.765		
Fisher's Exact Test	2.727			.574		
Linear-by-Linear Association	1.096[b]	1	.295	.297	.170	
N of Valid Cases	310					

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is 1.31.

b. The standardized statistic is -1.047.