Enhancing the effectiveness of design and build tendering.

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Enhancing the Effectiveness of Design and Build Tendering

by

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Abstract

Design and Build is a range of procurement routes believed to effectively transmit client value through the supply chain owing to its integrative nature. However, the tender process is characterised as complex and there is a lack of practical guidance for practitioners.

The aim of this research is to critically evaluate Design and Build Tendering in the UK construction industry using a modified grounded theory methodology and mixed-method approach. A number of important themes emerged during the analysis.

Client-main contractor tender processes were mapped and several areas of best practice were articulated. Alternatives and menu pricing emerged as being important as they allow contractors to add value in developed forms of Design and Build. In addition, a Value Management-based tender evaluation process was developed which more closely relates the client's value system to the selection of the main contractor.

The study of main contractor-subcontractor tender processes and contractor-centric SCM was carried out using a case study. It was found that effective tender processes overwhelmingly rely on healthy relationships. The properties found to be necessary to cultivate and maintain these relationships include trust, communication, collaboration, commitment, integrity and honesty, concern for each other's interests, recognition and incentives, and transferability. Similarly, a number of important findings relating to the actual tender processes emerged including, for example, 'secondary sendouts' and unsolicited tenders.

This research represents a unique synthesis of Design and Build tendering, VM and SCM. It provides numerous and significant contributions to knowledge in the field by focusing on the different levels of the supply chain. The research highlights the importance of transitioning client value through the wider supply chain by focusing on main contractor-subcontractor tender processes, in addition to the client-main contractor tender process. It draws on a number of new findings to make the case for contractor-centric SCM. The number of recommendations which are made for Design and Build tendering strategy, at both the client-main contractor and main contractor-subcontractor level of the supply chain, will collectively help enhance the effectiveness of Design and Build tendering.

Chapter 1: Introduction

1.1 Research Context

The UK construction industry's £46 billion of new-build investment (Construction Outlook, 2008) is funnelled through a range of purchasing systems, or more aptly named, procurement routes. Design and Build can be considered an umbrella term for a range of popular procurement routes which are used to procure large amounts of this investment by a range of public and private clients which form the focus of this study. More specifically, this study aims to critically evaluate Design and Build Tendering in the UK Construction Industry in order to increase the effectiveness of tendering associated with this procurement route. The client's value system is transferred from one party to another at tender stage, and the need to ensure this is carried out effectively, is paramount.

Indeed, ensuring the billions of pounds invested in the UK construction industry successfully meets its intended objective, relies in large part on how effectively a procurement route enables the tender point (as one of various value transition points), to work effectively (Kelly *et al,* 2004).

Building on the work of Porter (1985), the journey a construction product takes from its initial identification, through to its realisation as a physical entity used for its intended purpose, has been conceptualised as a project value chain (Male and Kelly, 1992). The chain analogy is useful as it illustrates how many different organisations and individuals are involved in transmitting, transforming and maintaining the client's values, termed 'the value system', along its journey in order to provide value for money (Standing, 2001). Considering construction projects in this way, as a series of linked value adding activities focused on meeting the client's defined needs, draws attention to the potential for discontinuity as the project progresses through different transition points, where the client's value system is passed from one party to another.

The small amount of literature which addresses tendering on Design and Build highlights the added complexity of tendering in this particular procurement route (CIOB, 1988). In addition, the limited research which has explored Design and Build tendering has focused largely on the tender processes which take place between the client and main contractor at main contract tender stage. Whilst the client-main contractor tender stage represents a crucial transition point, it is only the first of many such tender transition points which take place; for every client-contractor tender process, there are generally multiple subsequent main contractor-supply chain tender processes, which take a multitude of different forms.

The popularity of Design and Build allied to this apparent complexity, represents a significant opportunity to reduce the effectiveness of this procurement route in adding value and ensuring the client's value system is closely aligned with the finished construction product. This research addresses the gap in literature and need for greater understanding in this important area by exploring tender processes at both the client-main contractor and main contractor-subcontractor level in the supply chain. Taking account of the increasing popularity of Supply Chain Management (SCM) in helping improve the effectiveness of UK construction (Egan, 1998; Strategic Forum, 2002; CBPP, 2003), the study is amalgamated with an enquiry into SCM, and more specifically, construction-specific SCM. The inclusion of SCM enables the integrative properties of this increasingly important best practice approach, to help improve the effectiveness of Design and Build tendering.

This research seeks to enhance the effectiveness of Design and Build tendering, using an inductive mixed-method research design. Also termed 'methodological pluralism', the need for this type of balanced approach to research in the field of construction, has been strongly advocated by Dainty (2008). By developing a deeper understanding of the Design and Build Tender Process, both in terms of client-main contractor transition points and main contractor-supply chain transition points, this thesis presents various new and significant findings which can help increase the effectiveness of the tender process. Basing policy decisions on a deeper understanding of value, tendering and supply chain management, has the potential to transition much more effectively through the supply chain. This, in turn, will help the multitude of clients who channel huge sums of public and private investment through the Design and Build procurement route generate better value for money.

1.2 Research Aims and Objectives

The following title, aims and objectives were developed iteratively to focus the research:

Title: Enhancing the Effectiveness of Design and Build Tendering.

Aim: To critically evaluate Design and Build Tendering in the UK Construction Industry.

Objectives

The following objectives were developed iteratively owing to the inductive research approach adopted in this study:

Objective 1: To understand the nature of the Design and Build Tendering Process.

Objective 2: To explore client-main contractor tendering processes in Design and Build.

Objective 3: To identify best practice relevant to the Design and Build Tendering Process.

Objective 4: To explore the concept and communication of client value in Design and Build Tendering.

Objective 5: To explore main contractor-subcontractor tendering processes in Design and Build.

Objective 6: To explore the potential for contractor-centric Supply Chain Management to increase the effectiveness of Design and Build tendering.

1.3 Thesis Structure

The following thesis structure has been developed to provide the most logical and easily navigable route to present the work that has been carried out.

1.3.1 Chapter 1: Introduction

This chapter introduces and contextualises the thesis. It sets out the aims and objectives, summarises the thesis structure and sets out the limitations of the work.

1.3.2 Chapter 2: Conceptual Analysis: Value and Design and Build

This chapter is broadly split into two parts and provides the context for the work by introducing the reader to the nature of value and how this relates to Design and Build procurement; both of which lie at the heart of the thesis.

It commences by defining value in terms of objective value, subjective value, value in use, value in esteem and value in exchange. It then introduces the concept of the value chain, which shows how the demand for construction products stems from an organisation's strategic business planning process, itself comprising numerous and different individuals with diverse, and often competing, value systems. The next section explores how Value management (VM), offers formal mechanisms to derive collective agreement between individuals with different, and often competing, needs.

The value chain highlights the importance of aligning the client's value system (the original definition of the clients requirements), with the project value system (the numerous different parties located in the construction industry who become involved in designing and constructing the construction project), to ensure every stage in the value chain adds value and the final product aligns with the client's value system. The construction procurement route plays a major part in how well the project value chain is maintained, by how effectively it transfers, or encourages value addition, or indeed creates barriers, or discontinuities to value transfer and addition at each transition point. The value chain and transition points play a major part in the rest of the thesis.

The second part of the chapter provides a detailed understanding of Design and Build procurement. It commences by exploring Design and Build by contrasting it with its counterpart Traditional Contracting. The historical Context of Design and Build is then mapped, highlighting how Design and Build became popular, as it was believed to remove many of the problems associated with its counterpart. The chapter concludes by defining Design and Build and arguing that it should be considered a family of procurement routes before reflecting on the way that Design and Build is now subsumed within many other modern types of procurement route, which although share similarities with the research topic, fall outside the scope of this study.

1.3.3 Chapter 3: Conceptual Analysis: Tendering and Supply Chain Management

This chapter is structured in three sections exploring the following areas:

1.3.3.1 Development of Tendering in UK Construction

The development of tendering processes by making reference to the major Government sponsored reports and other key works which have impacted on tendering in the UK construction industry over the last 60 years. Selective tendering was introduced to avoid the problems associated with open tendering. It brought a greater focus on quality owing to the way that the prequalification process component of selective tendering assesses potential contractors on the basis of various quality criteria before allowing them to tender. The focus on quality developed into a more widespread message to select contractors on the basis of value for money, rather than simply considering the lowest capital cost tender. Such an approach incorporated selecting contractors on their ability to add value, yet hinged on the client's ability to articulate what value means to them for the project, a theme which is explored in chapter two.

1.3.3.2 *Tendering Mechanisms*

The different tendering mechanisms, such as open and selective tendering, used in UK construction which culminated in a focus on tendering mechanisms used specifically on Design and Build projects. Tendering on these types of projects is presented as being substantially different, and more complex, than tendering on Traditional contracts. This is undoubtedly the case where the client must decide between the way that contractors interpret their needs, for example in a design competition. The problem stems from the requirement to decide between 'apples and pears', as the competing contractors schemes will differ. Unfortunately, literature in the field is less useful in articulating approaches to deal with such a situation.

1.3.3.3 Supply Chain Management

Supply Chain Management, which has been increasingly proposed as a way to increase the performance of the UK construction industry by helping to reintegrate what is commonly regarded as one of the industries biggest problems; fragmentation. SCM development in the UK construction industry has become polarised around large clients with standardised long-term demand profiles, as evidenced by the literature reviewed. Such a specialised client-centric approach leaves the majority of the industry unable to harness the benefits of SCM. Whilst the literature is clear on how few clients have the requisite demand profiles to act as successful SCM protagonists, it is less forthcoming in alternative ways to propagate successful SCM. The argument is forwarded that contractors, as the organisation located at the head of the demand channels for numerous projects, are well placed to develop their own organisational supply chains, and pass the benefits of SCM to multiple parties, including their clients.

1.3.4 Chapter 4: Research Design

This chapter presents a detailed discussion of the research design forming the foundation of the thesis. The chapter follows the following format:

1.3.4.1 Theoretical Perspective

The chapter commences by discussing the Grounded Theory (GT) theoretical perspective adopted in the study. More appropriately titled 'modified GT', the theoretical perspective eschews the more clinically inductive understandings of GT (Glaser, 1992), and instead accepts existing knowledge and thereby purposefully takes account of existing literature.

1.3.4.2 Methodology

The mixed-methodological approach is discussed next, which utilises both qualitative and quantitative approaches. Justification for this approach is provided by arguing that the mixture of depth and breadth that the case study and survey approach respectively provide, is needed to explore the field of enquiry. The need for construction management research to adopt mixed approaches, also called ‘methodological pluralism’, is forwarded by Dainty (2008).

1.3.4.3 Methods

A questionnaire survey, semi-structured interviews, an expert focus group, listening days, company data and a literature review, were used in the study. The questionnaire survey was developed from the issues which emerged from the interviews. Semi-structured interviews, closely associated with GT, were used to allow new issues to emerge, whilst allowing predetermined topics to be discussed.

The expert focus, two ‘listening days’, and literature are then discussed. This section of the chapter concludes by discussing ways in which the access to participants was helped greatly by the perceived status of the research, and the way that the case study was sanctioned by high-level staff in the main contracting organisation forming the core of the case study.

1.3.4.4 Analysis

The section concludes by outlining the approach to analysing the interviews and postal questionnaire. The questionnaire was analysed using the Statistical Package for Social Sciences (SPSS v10) software package, and the study utilised descriptive statistics in the form of mean, median and mode averages and frequency counts. The section concludes by exploring how the interviews were analysed using Computer Aided Qualitative Data Analysis Software (CAQDAS).

1.3.5 Chapter 5: Client-Main Contractor Tendering

This is the first of two empirical chapters discussing the findings of the study. The chapter commences by reporting on the popularity of Detail-Developed Design and Build. The reasons behind the move to adopt this type of Design and Build are explored, including the core theme of risk transfer and lower order themes of tender cost and complexity, consultant advice on project complexity, client type and accelerated project programme.

The next section explores the nature of the tender process for developed forms of Design and Build, highlighting the simplicity of this form of tendering. This is followed by an exploration of the compliancy of tenders and shows how contractors often find it difficult to completely comply with the client's scheme as encapsulated in the Employer's Requirements. Alternatives are often offered by contractors in addition to a compliant tender, as a way for them to add value and generate competitive advantage over their competitors at tender stage, and they are discussed next along with 'menu pricing'. Menu pricing describes a situation where clients specify their own alternatives for a contractor to price.

The next section explores tender processes associated with purer forms of Design and Build, which have minimal pre-contractor design and specification development. Two-stage and single-stage approaches are explored, including the presentation of a VM-based tender evaluation process, developed during the research study. The VM-based approach, forwarded in this thesis, is unique in that it incorporates the initial articulation of the client's value system, and then relates this directly to the different contractor's tender submissions in one integrated process.

1.3.6 Chapter 6: Main Contractor-Subcontractor Tendering and Contractor-Centric Supply Chain Management

This chapter presents the findings of the case study focusing on SCM and main contractor-subcontractor tender issues. The finding that healthy relationships were the most important factor impacting on the ability to work effectively together and meet the client's value system, led to the properties of a healthy relationship being articulated.

The second section of the chapter goes on to explore tendering-specific issues. It explores the eight significant issues which emerged during the study. It is argued that main contractors and clients need to take account of the findings and make appropriate changes, to enable them to more effectively manage their supply chain in order to help increase the effectiveness of Design and Build tendering.

1.3.7 Chapter 7: Conclusions

The conclusions pull the different strands of the thesis together by addressing each objective in turn and making practical recommendations for client and contactor strategy. This chapter concludes by making recommendations for future research.

1.4 Limitations of the Research

The research has clearly defined boundaries to enable appropriate focus on the key areas of study. The study makes no claims of statistical generalisability, yet every effort has been made to increase the transferability of the findings. Whilst literature and data is incorporated from other countries to help inform the study, the work has a UK focus. Ensuring the work was appropriately focused meant excluding certain procurement routes which share its essential features. As such Private Finance Initiative (PFI), Private Public Partnership (PPP) and Local Improvement Finance Trust (LIFT) projects, were specifically excluded from the work. In addition, with the exception of a brief introduction, negotiated methods of tendering fall outside the cope of study. Whilst certain aspects may offer a degree of transferability to these projects, they each share unique properties which may affect adoption of the recommendations set out in this thesis.

Chapter 2: Conceptual Analysis: Value and Design and Build

2.1 Introduction

This chapter commences with an exploration of client value before moving on to explore Design and Build procurement. It is structured in this way, addressing value first, as this approach mirrors the chronology of the construction process. As such, it begins with an understanding of the client's value system prior to formulating an identifiable need which, in turn, is met by a construction project procured in a number of different ways. Value, as embodied in many different forms of construction best practice rallying cries such as ‘best value’, ‘value adding’ ‘value maximisation’ and ‘value for money’, is common currency in the construction industry. Clients increasingly use these phrases in their discourse, as they seek to ensure that the construction supply chain meeting their requirements, provides evidence that value will be maximised on their projects.

Government clients, both local and central, have been particularly zealous in their adoption of value-based approaches to procuring construction products. This is demonstrated by the movement from Compulsory Competitive Tendering (CCT) to a Best Value (BV) approach. In the influential Latham report (1994), value for money was placed first out of eight wishes clients had for construction. For Green (1996), this call was narrowly translated by the industry as a focus on cost reduction related to Latham’s call for a 30 percent reduction in real costs by 2000. *Rethinking Construction* (1998), Sir John Egan’s report on the scope for improving the quality and efficiency of UK construction addressed the problem of mistaking lowest cost for value, particularly by the public sector, in its manifesto for modernisation of the industry:

> ....too many clients are undiscriminating and still equate price with cost, selecting designers and constructors almost exclusively on the basis of tendered price. This tendency is widely seen as one of the greatest barriers to improvement. The public sector, because of its need to interpret accountability in a rather narrow sense, is often viewed as a major culprit in this respect. The industry needs to educate and help its clients to differentiate between best value and lowest price (1998: p.7).

Whilst the popularity of the term ‘value’ and all its derivatives within the construction arena cannot be doubted, the shallow depth of understanding is startlingly clear. Prior to trying to maximise value, or even define what it represents to different people in different situations, there is a need to gain a fuller understanding of what value actually means. The high profile *Accelerating Change* report by the Strategic Forum for Construction (2002), which followed on four years later from *Rethinking Construction,* made the need to define value clear:

> It should be self-evident that, for a successful outcome, clients should enter the construction process with a clear understanding of their 'business' needs and their environmental and social responsibilities and hence the functionality they require from the finished product. They should also understand what value means for them (2002: p.20).

From this foundation it is possible to build more effective approaches to managing value through the construction process. As such, this chapter commences by defining value, drawing on the definitions of different types of value including value in use, value in exchange, esteem value and cost value. This is followed by highlighting how marginal utility theory, and particularly the concepts of diminishing marginal utility and indifference curves, can be used to help inform the client's value based decision-making process. The age-old problem of measuring value is a further key component in making decisions about value and is explored by reference to cardinal and ordinal scales of value.

The difficulty of defining what actually constitutes value, when we take into account the multitude of meanings allied to the diversity of construction clients, stands in contrast to the much repeated advice to 'achieve best value'. As such, focus then turns to consider how the value management process can be used to understand and articulate the client's value system, before helping to match the value system to a construction project in instances where the process leads to the decision to build. The concepts of the value chain and value thread are then introduced. The value chain is a useful analytic tool to understand the wider strategic management process and how the client's value system passes through various different supply chain transition points during the project cycle. The concept of the value thread is used to demonstrate the fragility of value transfer between the different supply chain parties involved in the overall project. The value chain and value thread are useful as ways of helping to ensure the client's value system remains the focus of the collective effort of the various members of the construction supply chain involved in the overall project process.

The second part of the chapter takes its starting point from the finding that it is the integrated nature of the construction procurement route, or purchasing framework, which has the most significant impact on how effectively the client's value system is transferred at each transition point. As such, it explores Design and Build; the popular family of integrated procurement routes. Design and Build is contrasted with Traditional Contracting, which fractures the design and construction process before discussing its historical context. The chapter concludes by defining Design and Build and outlining how novated Design and Build, and various modern procurement routes which utilise aspects of Design and Build, fall outside the scope of this study.

2.2 Value

2.2.1 Defining Value

Etymologically rooted in the French word ‘valoir’ (Shillito and De Marie, 1992), the problem of providing a clear and consistent definition of value, or utility as it also termed, is well evidenced by the range and diversity of descriptions which have been forwarded over the years (O’Brien, 1976; Adam, 1993; Norton and McElligott, 1995; Parker 1994). Historically, definitions of value have taken the economic viewpoint of costs to benefits expressed in monetary terms (Bell, 1994). The Office of Government Commerce (OGC, 2007), see value as the overall benefit to the client:

> Value, in its broadest sense, is the benefit to the client - that is, the project is worth doing and can be quantified in business terms (though not necessarily in financial terms); for example, creating a better working environment or improving the experience of patients during treatment (OGC, 2007:p. 5).

This pragmatic way of defining value differentiates between the financial and business benefits, and shares many aspects with Kaufman (1990), who breaks value down into four constituent parts:

$$Value = \frac{want(esteemvalue) + worth(exchangevalue) + need(utilityorusevalue)}{\boldsymbol{Cost}}$$

This equation is useful as it incorporates the four widely acknowledged concepts of value in the field of economics: value in use, value in exchange, cost value and esteem value. Value in use relates to the pleasure, or good, that a product or service provides for the individual(s) using it, or its ability to accomplish a task for which it is designed. Value in exchange is concerned with the amount of other commodities, generally expressed in the currency of money for which a product or service can be exchanged. Cost value represents the resources expended to produce or purchase a product or service, and comprises the monetary components of labour, material, overhead and associated costs. For example, construction costs include initial costs, also termed ‘capital expenditure’ (CAPEX), and future costs, also termed ‘operating costs’ (OPEX). Initial costs refer to the initial capital expenditure required to procure the construction project, whilst future costs include the ongoing maintenance and operating costs associated with the finished facility. In tandem with exchange value, cost value is perhaps the most widely accepted and commonly traded lay understanding of value. Esteem value, on the other hand, relates to the desirability derived from owning or using a product or service.

Relating these philosophical concepts to construction, which has, and still is, witnessing consistent calls to focus on overall value, can be best carried out by the use of practical illustrations. For example, consider the construction of a new football stadium for a major football club. Esteem value would, amongst other things, relate to the prestige derived from the finished development for fans, players, management and other stakeholders. Value in exchange would relate to the market value for the finished development, whether in outright sale or where let over a period of time. Cost value would relate to the actual cost of completing and operating the development over its lifecycle, whilst value in use would relate to how useful the finished development would be to its users. Considering value in this practical way, from the viewpoint of different people rather than a single client, sensitises us to the difficulties brought about by the different perceptions of value held by numerous parties. This crucially important aspect of value is dealt with later in this chapter.

The distinction between value in use and esteem value is based on how esteem value is taken to include 'pleasing rather than performing' functions, and draws attention to the distinction between functional and non-functional properties of a product or service (Thirly, 1997). Theories of value in philosophy distinguish between objectivism, where value is said to exist independently of human beings, and subjectivism, which relates to varying states of mind (Oliver, 2000). For Hanson (1969), utility, or value, has little to do with usefulness, as value is seen as being the amount of satisfaction derived, irrespective of how useful the product or service is in a particular way.

The different elements that comprise value in a construction environment have been previously modelled. Kelly (2007), used an action research approach to investigate the components of the client's value system in the early stages of the project process and found the nine non-correlated high order discretionary performance variables of: capital expenditure (CAPEX), operational expenditure (OPEX), time, esteem, environment, exchange, politics/community, flexibility and comfort. This work shows a great degree of correspondence with value in use, value in exchange, esteem value and cost value, showing how useful an understanding of the philosophy of value actually is in an applied environment.

The distinction between use value and esteem value is particularly important in the decision-making process which takes place in an economic environment of limited resources. Conceptually, distinguishing between value in use and esteem value is perhaps better understood as a parent and child categorisation, where use value is the overriding parent category and esteem value the child sub-category. Distinguishing between value in use and exchange value, perhaps the most important distinction in understanding value, is highlighted by considering two different commodities: water and diamonds. Whilst diamonds have a high value in exchange, i.e. they are exchanged for large amounts of money, they have relatively little value in use when compared with water. However, they are valued for their beauty and have a functional value in use as cutting objects (which can, in most instances, now be widely replicated synthetically at much lower cost).

Water, on the other hand, has a massive value in use; humans cannot survive without it, whilst at the same time it has a low value in exchange. In contrast to diamonds, water has a low value in exchange. Termed the ‘paradox of value’ (see figure 2.1) , and outlined by Adam Smith in his seminal work Wealth of Nations (1776), the situation puzzled philosophers for many years until the development of the theory of marginal utility, which is believed by Lipsey (1989) to be the first substantial development in demand theory; itself a central foundation of modern economic thought. Whilst the paradox still holds, perhaps the traditional example given above, of water and diamonds is becoming outdated owing to the increasing value of water in today’s society.

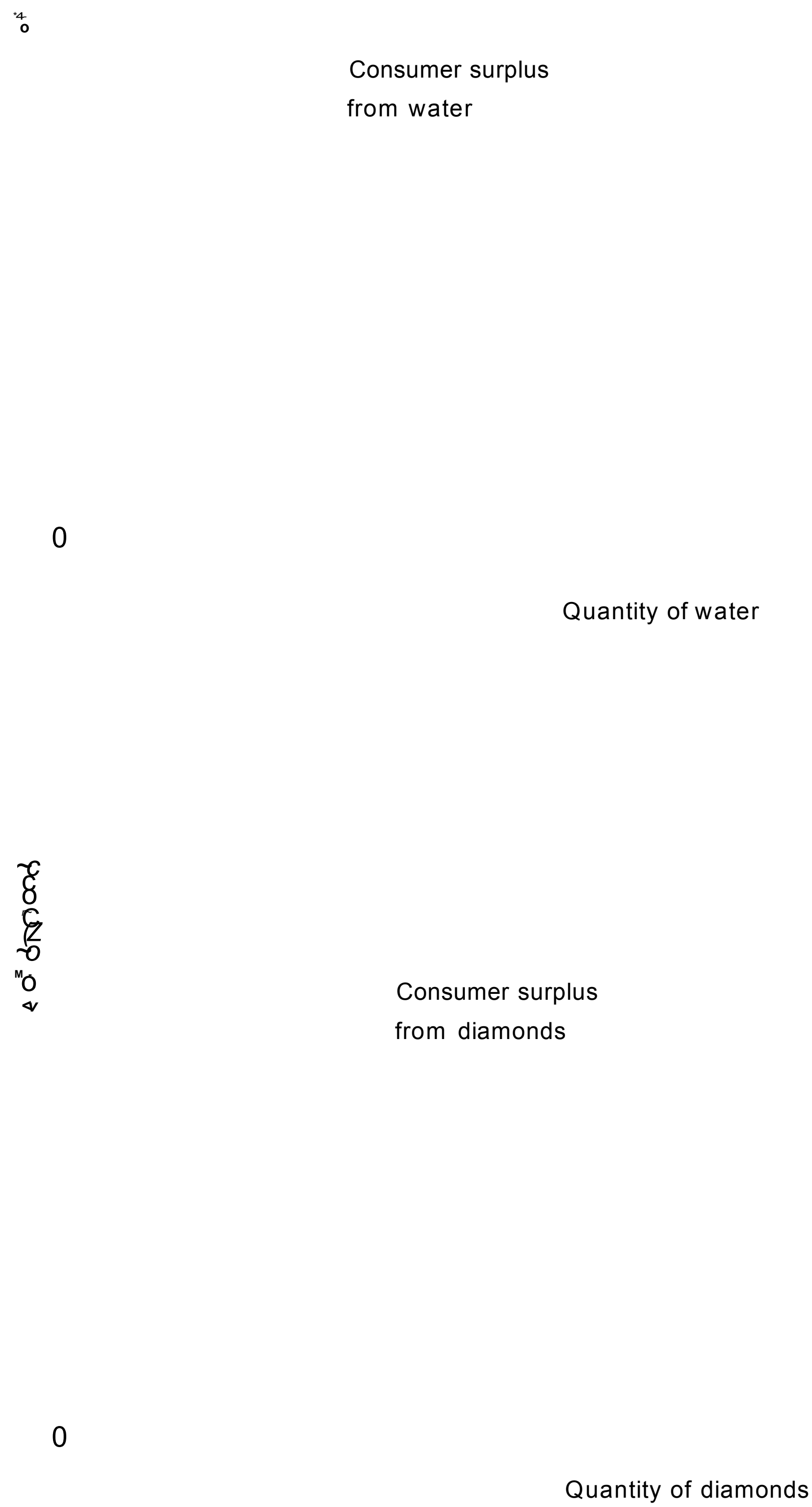

Figure 2.1 The Paradox of Value, (Adapted from Parkin (2003)

2.2.2 Marginal Utility Theory

Marginal utility theory is based on the assumption that consumers derive utility from the goods they consume and each additional unit of consumption provides additional total utility. Marginal utility theory divides utility, or value, into *total* and *marginal* utility. Total utility, as its name suggests, describes the total utility derived from consuming goods or services; with more consumption providing greater total utility as shown in figure 2.2. In contrast, marginal utility describes the extra utility derived from each additional unit of consumption. Consumption of each additional unit provides less utility than the first unit, hence marginal utility decreases with increased consumption; a phenomena termed ‘the law of diminishing marginal utility’ as shown in figure 2.3.

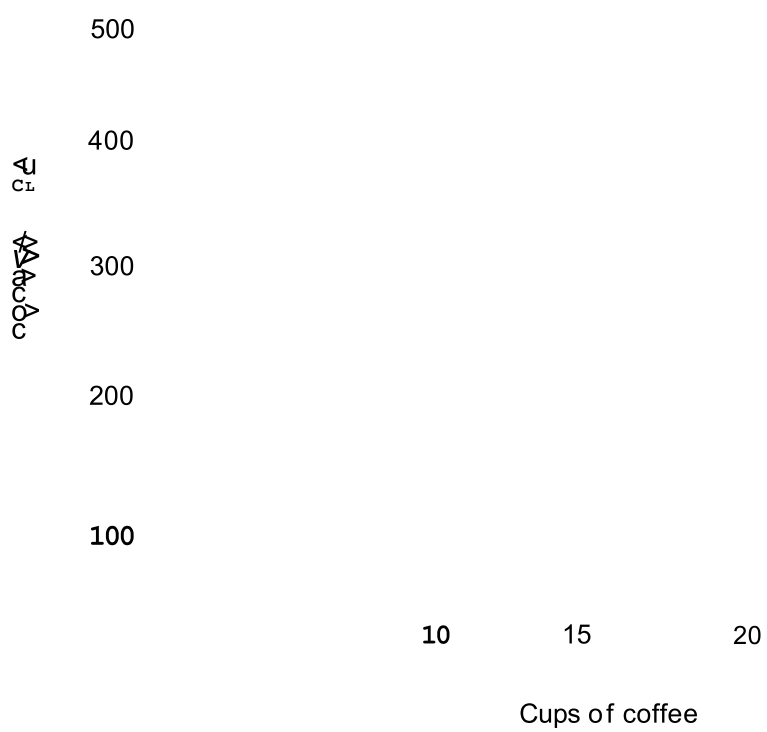

Figure 2.2 Utility Curve

D C O) u

Marginal utility

5 10 15 20

Cups of coffee

Figure 2.3 Marginal Utility Curve

Related to the paradox of value, we can see that the first cup of coffee that a coffee drinker consumes provides very high levels of total utility, but the marginal utility they will derive from each additional cup of coffee consumed, quickly drops to very low levels. In contrast, whilst diamonds have a low total utility, owing to the way we consume few diamonds, they have a high marginal utility. Marginal utility helps us to consider how choices are made in an environment of limited resources. Construction clients’ budgets are limited and there is an opportunity cost, (the lost opportunity from the forgone alternative with the highest value), to making different decisions. For example, in a school, each additional classroom may provide more marginal utility, when compared to using that money to provide a waiting room for a specialist child services unit;

considering options in terms of the marginal utility they provide, can help increase the effectiveness of the client's decision-making process.

The law of diminishing marginal utility, allied to indifference curve analysis, which was developed by Edgeworth (1845-1926), is particularly pertinent to this research as it can be used to explain construction clients' preferences for one option compared with another and relate both to clients' budgetary constraints. Indifference curves are based on the assumption that individuals can categorise two goods and services, or baskets of goods and services, in three ways: preferred, not preferred and indifferent, and this makes it is possible to visualise individual's preferences using a preference map as shown in figure 2.4.

Biscuits

Budget Constraint Line

Coffee

Figure 2.4 Indifference Curves and Budget Constraints (Adapted from Stiglitz and Driffill, 2000)

As can be seen, different quantities of two different goods are represented on each axis. The indifference curves show the points at which a consumer is indifferent to the consumption of the combinations of goods. For example, indifference curve I2 represents how an individual is indifferent whether they consume less coffee than biscuits as at point A, or whether they consume more coffee than biscuits at point B. It is assumed that indifference curve \^, which is a higher indifference curve, will always be more favourable than I0 as the consumer can consume more of both goods at any given point. The budget constraint line is the point at which consumption is restricted and indicates how much of either good can be purchased given the available budget. As such, in this instance line 11 is above the budget constraint line, the consumer cannot purchase at any pint on the line. Point C is the point of 'tangency' and is the point where the consumer will select a mixture of the two goods (Stiglitz and Driffill, 2000). Relating this to construction, the budget constraint line indicates the amount of money available to meet the various, and competing, needs of the client. In turn, this allows us to see how clients must make a decision between differing options, with the aim of selecting the optimal solution.

2.2.3 Measuring Value

Selecting between different alternatives leads us to question 'how do we actually decide between different alternatives?' In order for decision-makers to decide between different alternatives, in an environment of scarce resources and restricted budgets, they need to consider the benefits derived from consuming one good, or basket of goods, compared to the cost of not consuming the other good(s); the assumption being that a rational individual will choose the option offering the highest overall value. The measurement of value has a long history in philosophic thought, from Aristotle through to Jeremy Bentham (1748-1832), the founding father of Utilitarianism, and his predecessor John Stuart Mill (1806-1873). Bentham's work was based on his distinction between social hedonic calculation, which is based on maximising aggregate utility, and individual hedonic calculation. Bentham argues that almost all humans seek to maximise their individual happiness, which is the pursuit of pleasure over pain, and that all their actions are based on this truth. His work included an equality of utility principle, where each individual's utility was deemed equal to every other individual; hence, a king had an equal right to pleasure as a pauper. He believed that once science had developed to a suitably advanced state, a machine would be developed to provide accurate readings of how happy individuals actually were, thus enabling preference choices to be carried out in a simple and objective way. Such an approach is embodied in Bentham's work and to some extent in Marshall's (1842-1924) belief that value could be measured using a cardinal scale.

This type of scale enables value to be added and subtracted owing to the regularity of the intervals on the scale; i.e. the intervals, described as utils (Begg et al, 1994), are consistent. Such measurement, whilst lacking a defined starting point as is the case with, for example, weight calculations, is generally carried out by comparing two goods at the same time. To illustrate this point, consider as an example, a certain type of marble floor finish (A) provides a client with 50 utils of pleasure, and a terrazo floor finish (B) provides 25 utils of pleasure. We can not only say that A provides more utility than B, but using a cardinal scale we can say that option A actually offers twice as much utility than option B.

Such cardinal measurement is extremely demanding and assumes that the value derived from a good or service is solely a property of that good or service and is independent of all other goods or services (termed the additive function). The cardinal measurement of value was rejected by Pareto (1848-1923) who argued for use of the much less demanding ordinal scale, which simply distinguishes between an individual's *order* of preference, not *how much* preference is derived; a much less onerous requirement. The ordinal scale underpins much contemporary economic theory, yet many value-based approaches in construction, such as value management, still incorporate the cardinal scale of measurement.

2.2.4 Client Types and Collective Value

The preceding discussion has, for sake of simplicity, focused on how value relates to individuals, rather than organisations which comprise numerous individuals.

Clients to construction are a heterogeneous group of organisations facing different environments and with a diversity of reasons for existing, with different objectives, cultures and value systems (Kelly *et al,* 2004, p. 154).

Construction clients encompass a massive variety of organisations, or individuals, who commission construction projects (Bryant *et al,* 1969). Kelly *et al* (1992), building on the work of Newman *et al (*1981), produced the following broad client classification to aid the briefing process:

1. Large Owner/Occupier.

2. Public/Private Sector.
3. Developer.
4. Small and/or Infrequent Owner/Occupier.

Male *et al* (2003) subsequently added refurbishing retailers as another category. Owing to the complexity of the construction sector, the unique nature of its products, and more specifically the decision-making process, the degree of experience that the construction client has is crucial. Masterson and Gameson (1994) placed the client's experience at the centre of their four-level typology:

1. Primary inexperienced.
2. Secondary inexperienced.
3. Primary experienced.
4. Secondary experienced.

For Green *et al* (2005), the experience of the client has a big impact on how successful they are with construction: 'contractors may position themselves strategically to take advantage of inexperienced clients' (p. 585). However, experience means more than not being taken advantage of, as experienced clients are increasingly being seen as having a major role to play in championing industry change. One of the key thrusts of the Egan Report (1998), which constitutes an extremely influential construction industry agenda for change, is that clients should be the chief protagonists leading the construction industry to better practice. Lui and Fellows (1999), believe experienced and expert clients, having access to professionals from a design and construction background, are becoming increasingly demanding. Owing to their financial power and propensity to trial new approaches which draw from other industries, they are seen as driving industry performance improvements.

Another key issue impacting on client experience is the nature of the client's demand profile. Kelly *et al* (2004), believe clients can be categorised in the following ways by referring to the nature of their demand frequency, volume and the degree of standardisation that they require:

1. Unique - distinctive technical content, high innovation and projects which push the industry's skills and knowledge.
2. Customised - incorporates the foundations of existing designs and modifies to suit needs.
3. Process - repeat demand and substantial standardisation owing to high volumes.
4. Portfolio - regularly procuring large and ongoing programmes of investment with diversity in uniqueness, customisation and the technical requirements of their needs.

These various ways of categorising clients begins to highlight the wide range of clients who are involved in making decisions about what constitutes value and how that need will be realised by the construction industry. The majority of construction clients are organisations comprising different individuals with different and competing needs. Consider, for example, an education client developing a new school. The client will comprise various different stakeholders, from inside and outside the organisation's boundaries, such as teachers from humanities and sciences, and the children attending the school. In addition, the same client will be open to external influences such as central and local government, other funding bodies and the children's parents. Understanding and meeting these different and competing needs is a further significant problem for those seeking to maximise overall value for money.

As has been identified, measuring the value individuals derive from different options can be a significant problem in itself. When we consider the way in which construction projects meet the needs of multiple parties, in order to provide collective utility, the difficulty is all too evident. Value management workshop techniques offer formal mechanisms to derive collective agreement between individuals with different and competing needs (Green, 1996). Pragmatically, such techniques often adopt a cardinal scale approach to measuring value despite recognising the core difficulties with such an approach. It is now appropriate to consider how value management can be used to help clients determine what constitutes value and align this value system with the products of the construction industry.

2.2.5 Value Management

Value management is the name given to a process in which the functional benefits of a project are made explicit and appraised consistent with a value system determined by the client, customer or other stakeholders (Kelly *et al* 2004: p. ix).

This definition of value management (VM) highlights how it can be used to deliver value for numerous individuals. This is carried out by firstly making value (in its numerous guises) explicit, reaching a consensus agreement on what constitutes collective value (or indeed, what constitutes value for the powerful protagonist(s)), and then evaluating how the construction project corresponds to these values. Atkin and Flanagan's report for the RICS identified value management as one often critical success factors for improving value for money (1995). Value management is often confused with value engineering. Value management is the high level process of managing value for the construction client over the entire business project. Value engineering, in contrast, is simply one aspect of the value management process which deals with the technical aspect of the construction project:

> Value engineering is a continuous process in which all the components and processes involved in construction are critically appraised to determine whether better value alternatives or solutions are available. It is helpful for reducing wasteful processes and inefficiency in specific aspects of the design, construction and maintenance (OGC, 2007: p.5).

Value management is sometimes split into 'soft VM' and 'hard VM' (Green, 1999; Green and Liu, 2007). Whilst recognising the difficulty of defining value management *perse,* Green and Liu (2007) define soft and hard VM in terms of their epistemological foundation:

> ....the advocates of soft VM emphasize the way in which groups of individuals participate in the creation of a shared social reality. In contrast, we would argue that the advocates of hard VM tend to adopt an objectivist stance that sees reality as essentially independent of individuals participants' views and beliefs (2007:p. 650).

Green's earlier work (1996) focuses heavily on the underlying ontology of different approaches to value management. For example, Green criticises Kelly and Male's (1993) approach to value management for what he sees as its positivist ontological stance. Despite positivism being more appropriately categorised at the level of epistemology, and as such concerned with theories of knowledge, rather than at the level of ontology concerned with theories of existence, Green's addition to the debate is useful as it leads us to think of the client's value system being co-created rather than discovered as something that already exists.

The historical development, and shifting definitions and terminology of value management, value analysis, value planning and value engineering, shed light on the differing nature of approaches used. Value management was originally termed value analysis and originated in the United States military manufacturing industry of the late 1940s. It began with a focus on both identifying unnecessary cost, and ensuring the required functionality was achieved at the lowest cost (Kelly and Male, 1993). It was during the first formal programme of value analysis, in 1954 by the US Department of Defence's Bureau of ships, that the term value engineering began to be used, and it is still the most common term used in the USA today (Kelly, 2007). The 1960s saw value engineering begin to be adopted in UK manufacturing (Crum, 1971). It took until the 1970s, and early 1980s, for value engineering to be adopted by the construction industry in the US, Canada and Japan (Parker, 1977; Szoke and Dandri, 1980). Kelly and Male's work for the Royal Institution of Chartered Surveyors (1988), evidenced value engineering being increasingly adopted in the UK construction industry. Interestingly, this work proposed a shift in terminology from value engineering to value management. Contemporary thought in the UK sees value management as the overarching approach, which incorporates the overall business project and includes value analysis, value engineering and value planning (Kelly and Male, 1993; Norton and McElligott, 1995; CIB, 1996; Kelly and Male, 2004). The belief that value management can play a pivotal role in aiding the improvement of the construction industry, is clearly evident from its inclusion as a centrepiece of numerous high-profile change initiatives (Latham, 1994; Egan, 1998; Strategic Forum, 2002).

Taking account of the difficulty of defining and measuring value, choosing from different options, and agreeing a collective value system, naturally leads one to question: 'how indeed does value management manage value?'. Whilst a full and detailed exploration of value management falls outside the scope of this study, a brief tour of the main aspects draws attention to its importance in ensuring value is first identified and then maintained throughout the various phases of the project process. Value management, as a change process, encompasses a range of different study styles, which have been defined as 'an outcome of the stage in the project life cycle at which the process is conducted' (Kelly and Male, 2004: p. 105). Each study style takes place over the following three phases (Kelly *et al,* 2004):

1. Orientation and Diagnostic Phase - This stage prepares the value manager and value team for the study and involves understanding the project in further detail including those involved in the project, such as the 'client' and other key stakeholders. This approach enables the *value problem* to be considered in detail and enables a suitable study style, one of the important aspects of the process, to be chosen. The next phase, the workshop phase, is considered and planned in detail, including possible outcomes and future steps.

2. Workshop Phase - Alternative perceptions of the value problem are explored with the aim of developing a consensual agreement on how it can be solved. In addition to clarifying different viewpoints, the main tangible output is a workshop report, including an action plan, indicating how the value solution will be implemented following this phase of the process.

3. Implementation Phase - Review workshops and implementation meetings help ensure the implementation phase remains focused on meeting the action plan. This phase has been found to be the most problematic of all phases (Male *et al,* 1998), and requires a systematic approach to implementing ideas generated in earlier stages.

The study styles represent a combination of different processes and approaches (Male *et al,* 1998) and take place at different value opportunity points (points of intervention), during the project lifecycle. The following studies take place at different value opportunity points which are shown diagrammatically in figure 2.5 related to the Royal Institution of British Architects (RIBA) plan of work (Kelly *et al,* 2004; interested readers should also read Green, 1996):

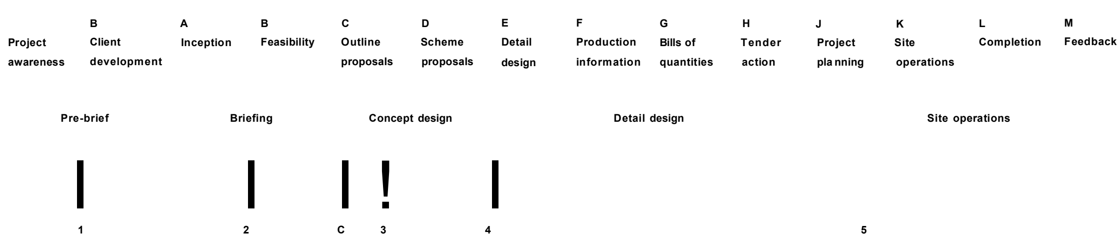

Figure 2.5 Value opportunities related to a modified RIBA plan of work (Adapted from Male et al, 1998)

1. Strategic Briefing Study - This stage focuses on understanding the primary reasons for the business project - why has the decision been taken to invest in this way at this time. The client's value system is developed by articulating the client's cultural values and commercial objectives, and forms the benchmark to assess all future decisions relating to the project. Tangible outputs include the output specification, which outlines the overall project aims and objectives and includes programme and budget details. This stage considers various ways of meeting the project needs, which may not include the construction of a new facility.

2. Project Briefing Study - This stage responds to the strategic briefing's expression of the client's requirements, by focusing on the technical project. This includes performance and spatial requirements related to an outline budget.

   C. Charette - The Charette can be undertaken at various points in the project cycle and it is not uncommon for it to be carried out following the completion of the concept design. It tests the congruence between the concept design and the strategic and project brief, in order to ensure the client's value system has been understood and is being realised. This part of the process logically follows the decision to build and can be carried out in isolation of all other stages as a one-time discrete process.

3. Concept Design Workshop - The Concept Design Workshop reviews and tests the technical project brief as encompassed in various outline drawings,

specifications and cost plans, which may be developed to the point of detailed planning permission. This stage may culminate in a decision to progress with the planned design development trajectory, or alternatively, may result in a decision to develop further design options.

4. Detail Design Workshop - Following the agreement of the concept design, the final detailed design and specification development commences and this effectively closes down the design process. This stage, which has a very technical focus, enables value engineering to be carried out to reduce waste and whole-life costing, life-cycle or through-life costs, to be introduced (Pasquire and Swaffield, 2002).

5. Operations Workshop - This stage is concerned with the detail of sequencing the works and its composition is dependant on the nature of the procurement route used. For example, more integrated procurement routes such as Design and Build would ensure the contractor's staff, and potentially the wider supply chain, were involved in the process, thus aiding its overall effectiveness.

Clearly, these formal techniques have much to offer in terms of understanding, articulating and realising the client's value system. The client's value system is crucially important, as the start and end point of construction projects which constitute such significant amounts of investment in the UK economy. Value management has been embraced as a key component of the construction industry's approach to improving overall project performance. For example, the

National Audit Office (NAO, 2001) believes a major barrier to the improvement of construction performance can be related to clients' limited awareness of value management and to contractors, sub-contractors, specialist suppliers and designers limited use of value management in the design and planning stage of projects. In addition, value management's importance is demonstrated by it having its own British Standard, BS EN 12973 (BSI, 2000).

Having explored ways of articulating, agreeing, and helping to meet the client's value system, we now turn to consider how the value system is maintained throughout a project using Porter's (1985) concept of the value chain and Bell's (1994) concept of the value thread.

2.2.6 The Value Chain and Value Thread

Kelly *et al* (2004), in their work on client value systems, adopt a systems perspective, and more specifically soft systems thinking, which starts with the assumption that a problem situation is unstructured, in order to focus on organisations, structures, people and processes. The 'problem' in this context is a 'value problem' to be solved using different types of evidence. They argue that value systems involve various 'actors' having different levels of interaction such as:

- 'Supra-systems' including the global economy, national governments and nation states.
- Industries.

- Organisations from the public and private sector.
- Teams, departments and divisions.
- Organisational roles.
- Individuals.

Value systems are built where any of these ‘actors’ make choices about the use and allocation of resources, based on the corresponding benefits and satisfaction derived. The organisational nature of clients means that their requirements for construction projects stem from their strategic management process, which is influenced by various factors such as structure, culture, ownership, strategic management processes and sector. As such, projects need to be aligned with corporate and business unit objectives to enable them to provide value for money. Michael Porter’s (1985) concept of the ‘value chain’ utilises an activity-based theory of organisations, where activities, more narrowly defined than traditional functions, create value and hence competitive advantage for the organisation.

The value chain is a way of dealing strategically with the activities any organisation undertakes, by assessing their role in differentiation and cost.

Every form is a collection of activities that are performed to design, produce, market, deliver, and support its product. All these activities can be represented using a value chain...(Porter, 1985:p. 36).

Male & Kelly (1992) extend Michael Porter’s (1985) concept of the ‘value chain’ from a competitive advantage focus into a project environment to be used with value management and termed it the ‘project value chain’. The project value chain links together the strategic management process providing a useful analytic tool, by first identifying a need to be met, followed by the construction project which corresponds to that need. In addition, the project value chain can be used to help ensure the construction project performs as efficiently and effectively as possible; the project exists as an addition to, and adds value to, the organisation's everyday activities.

Construction Value

Commision Value

Figure 2.6 The Project Value Chain (Standing, 2001)

Taking account of the differences in types of client, the project value chain consists of the programme level for clients with numerous individual projects, or the single project level for one-off clients. The different stages of the individual project chain are highlighted in figure 2.6. The fragility of the journey, from identifying a need and then fulfilling it with a construction project, has been termed the 'value thread' by Bell (1994). The 'value thread' holds that value should be transmitted, transformed and maintained throughout a construction project, from inception through to completion and eventual operation, to ensure value for money has been realised throughout the strategic management process.

> ...the transference of value through the different project stages creates a project value chain. There is the inherent potential within the project value chain for the transference of value to be successful or unsuccessful. The idea of a 'value thread' is introduced as an analogy to indicate the fragility of this transference within project activities (Kelly *et al,* 2004:p. 177).

Standing (2001) identified a multitude of different transition points in addition to the three separate, yet interrelated, value systems, which themselves represent major value transition points:

1. The Client Value System - Impacting the strategic phase of projects.
2. The Multi-Value System - Impacting the tactical phase of projects.
3. The User Value system - Impacting the operational phase of projects.

Examining these value systems in greater detail, quickly sensitises us to the multitude of additional transition points they encompass. For example, taking the multi-use value system, which essentially refers to the many different parts of the construction industry involved in construction projects, we can see how many different organisations, each with their own value system, priorities, focus and environmental pressures, are involved in transitioning value. The procurement, or purchasing, route, plays an incredibly important part in how successfully value is transmitted, transformed and maintained throughout the project cycle as highlighted by Kelly *et al* (2004):

> the effectiveness of a procurement system is the extent to which it permits value transition points to work effectively (2004:p. 188).

This is because the procurement route is the framework which incorporates the multitude of different *transition points,* where different parties interact to enable the design and construction of the construction project. There are a spectrum of different procurement routes which encompass a multitude of different approaches to purchasing the products of construction. For Standing (2001), the most significant factor affecting how effectively procurement route value transition points work, is the degree to which the procurement route integrates design and construction under the control of the main contractor:

> Basically the procurement systems that are contractor-led design keep the project value chain more or less intact (Standing, 2001 :p.37)

Figure 2.7 overleaf shows the extent to which different procurement routes integrate the multi-value system.

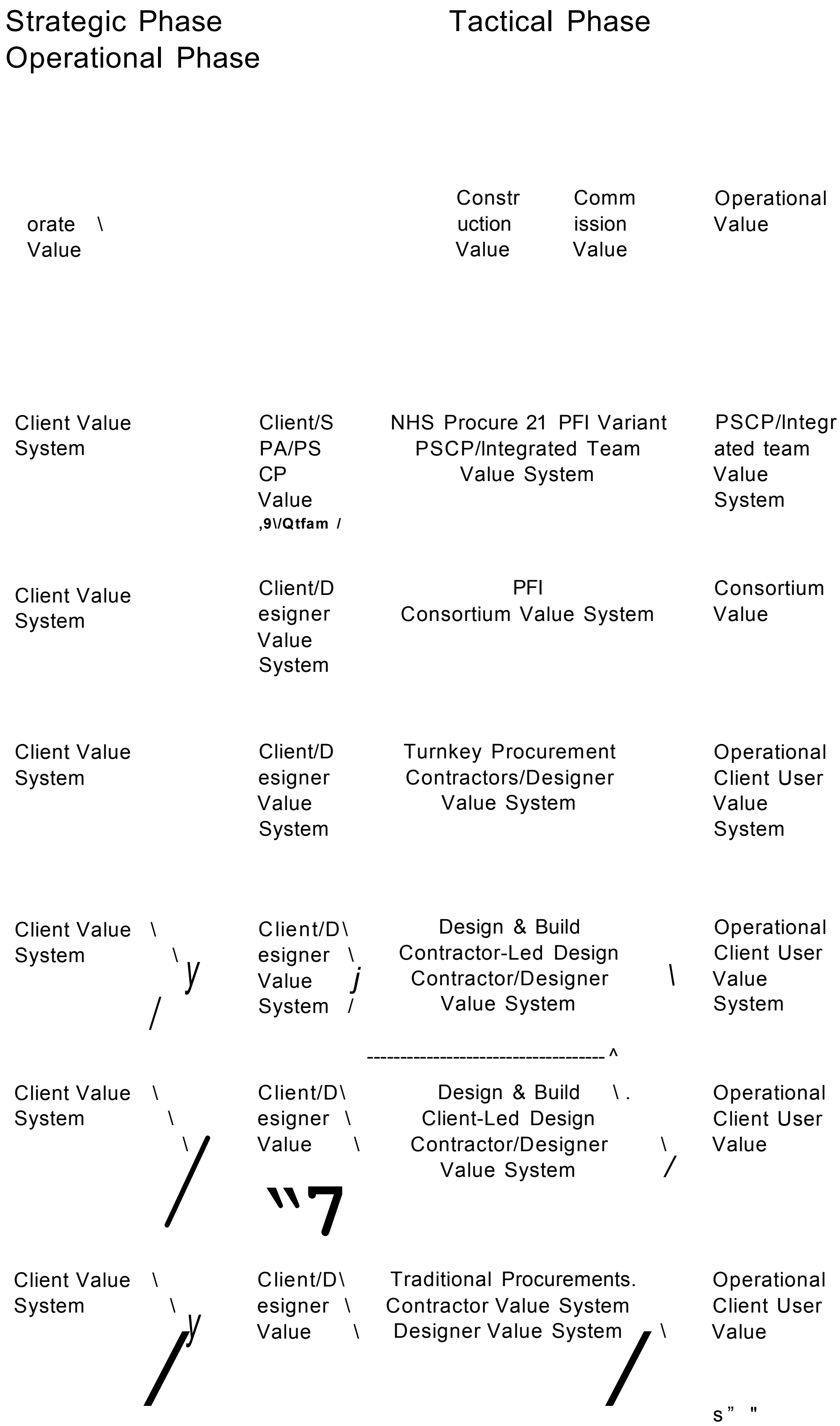

Figure 2.7 Procurement routes related to the project value chain (Adapted from Standing, 2001)

2.3 Procurement Routes

This section provides a background to construction procurement routes. As has been shown, procurement routes provide the framework encompassing the project value chain and have a massive impact on how successful the value thread is maintained throughout the construction project. The Achieving Excellence in Construction Procurement Guide (OGC, 2007) clearly outlines the need for integrated procurement and value for money:

> The primary consideration in the procurement of construction projects is the need to obtain best value for money in the whole life of the service or facility. The design and operation of the facility should maximise the delivery of effective public services; this is most likely to be achieved through integration of the design, construction, operation and ongoing maintenance (OGC, 2007:p. 2).

Taking its starting point from the central role integrated procurement plays in transitioning value (Standing, 2001), this section focuses on comparing the integrated Design and Build procurement route, with its non-integrated opposite: traditional contracting.

2.3.1 Design and Build and Traditional Contracting

Traditional Contracting has been defined as:

> ...the procedure whereby a client engages an architect and other consultants to design and control a building project and the construction is carried out by a main contractor appointed after competitive tender (CIOB, 1988: p.viii).

Main contractor
(standard lump sum
contract)

(various contracts)

Subcontractors

(standard lump sum)

Figure 2.8 Traditional Contracting Management Structure (adapted from RICS, 1996)

Traditional contracting separates design and construction:

> Traditional contracting is characterised by the inherent fragmentation of the procurement process where the design is undertaken by one party, the architect, before being let to tender and then constructed by another party, the contractor (Griffith *et al,* 2003:p. 10).

The design is developed by the client's consultants (to differing degrees) and then the project is encapsulated in various documents including a bill of quantities and put out to tender. Various contractors submit a price for completing the project, and generally the contractor submitting the lowest price will be selected to carry out the works. The risk for carrying out the works is still held by the client, and any issues with design flow, or incorrect design and specification which lead to changes, will be the client's responsibility.

Traditional procurement is, in its purest form, the polar opposite of Design and Build procurement, which has been defined as:

A building service where an organisation undertakes and accepts responsibility for both design and construction functions (CIOB, 1988: p.vii).

More recently, the *Office of Government Commerce Procurement Guide (2007)* reinforced the single-point responsibility nature of Design and Build by forwarding the following definition:

Using a single contractor to act as the sole point of responsibility to a public sector client for the design, management and delivery of a construction project on time, within budget (taking account of whole-life costs) and in accordance with a pre-defined output specification using reasonable skill and care (OGC, 2007: p.4).

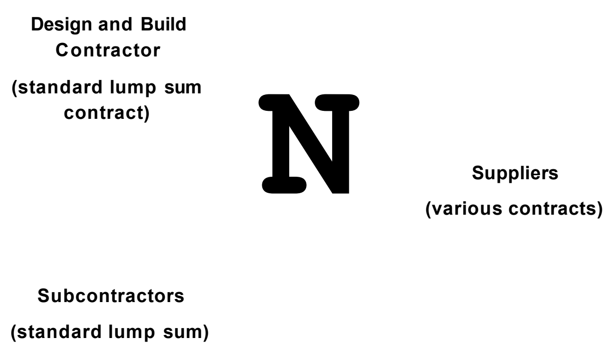

Figure 2.9 Design and Build Management Structure (adapted from RICS, 1996)

Design and Build can be considered 'a family of procurement options' characterised by their integrated approach, where one organisation is responsible, to differing degrees relative to the extremity of the variant, for the design and construction of the project. The contractor (or contractors in competition), develop the design and specification (from scratch or from the initial scheme development carried out by the client's consultants), and the contractor takes responsibility for completing the design and constructing the project. Its popularity is clear when one considers that since April 2000, Design and Build has been one of the three procurement routes which the government recommends.

Turner (1995), believes the key principle of Design and Build is that it 'simplifies the contractual position to that between employer and contractor, without mediating consultants' (1995:p. 15). This view differs from the cornerstone of most summations of Design and Build- that of the fusion of the design and construction processes. An example of the way Design and Build is perceived, is perhaps best summarised by the Office of Government Commerce (2007):

> Using a single contractor to act as the sole point of responsibility to a public sector client for the design, management and delivery of a construction project on time, within budget (taking account of whole-life costs) and in accordance with a pre-defined output specification using reasonable skill and care (OGC, 2007:p. 4)

The report follows on from the other major reports of Latham (1994) and Egan (1998) and has the following to say about traditional approaches:

> Traditional contract strategies, where the design and construction are provided separately, should only be used where it can be clearly demonstrated that this approach will provide better value for money than the preferred integrated procurement routes (OGC, 2007: p. 5).

Essentially, Design and Build was revived in the UK construction industry owing to dissatisfaction with conventional procurement routes. It is best characterised by its integrated approach to design and construction.

2.3.2 Historical Context of Design and Build

Design and Build has received much attention since its emergence as one of the most popular procurement routes in the UK over the last 30 years (Bennett *et al,* 1996). Masterman (1997), has collated much information from various government reports on the usage of different procurement systems over recent years and argues that there is a drought of reliable data. What can be established, however, is that Design and Build has gained in popularity owing to the perceived need for a dynamic alternative to the fractured conventional route.

The traditional, or conventional procurement approach, (Masterman, 1997), segregates design and construction, giving responsibility for each function to different parties. This system has been criticised for its time-reliant nature and its tendency to provoke an adversarial environment between parties to the projects (Pain, 1988). The 'conventional' term is essentially historic-contextual, representing something of a paradox. This stems from the fact that prior to the 20th century, design and construction were fused, and buildings were procured using a type of Design and Build method (CIOB, 1988). Design and construction were divorced, owing to the way the industrial revolution required a mobile workforce to fulfil the explosion in demand for new buildings. This led to the conventional approach being born (Pain, 1988). Dominant for many years, the conventional route remained popular until the 1950s and 1960s, when government reports (Emerson, 1962 and Banwell 1964) called for different approaches to procurement.

Emerson (1962) referred to integrated procurement routes as package deals and advocated their usage owing to the fusion of design and construction, whilst simultaneously acknowledging concerns over quality. The report believed that the lack of confidence between the contractor and architect, led to mistrust and mutual recrimination. Banwell (1964) identified the conservative nature of the industry and its reluctance to move forward; little has changed in the intervening years and the construction industry is still widely known to be a lagging slow adopter of new initiatives, spawned and developed in other industries. Reluctance to change is natural (Fryer, 1997), but once the advantages of embracing new methods in construction management became established, more integrated procurement routes were relatively quickly adopted. To some extent this was fuelled by many contractors seeing such specialism as a way to increase their competitive advantage in the marketplace.

Designing and Building a World Class Industry, a seminal report by Bennett *et al* (1996), found that:

Our research supports the premise that the design-build industry has a greater potential to make the changes needed to become truly world class than the traditional building industry' (1996: p.2).

The report's key findings include the following:

- Design and Build exceeds the speed of constructing using traditional procurement by 12%, cuts costs by 13% and reduces total project delivery speed by 30%.

- Design and Build is more effective at ensuring projects are delivered on time where the contractor is involved earlier in the design process, using less developed Employer's Requirements.

- Greater cost certainty is realised with more detailed Employer's Requirements, with the inverse true for less detailed Employer's Requirements.

- There is a 50% greater probability that Design and Build projects will be completed on time, and a greater probability that they will be completed meeting budgetary constraints.

- 60% of traditional projects meet the client's quality expectations, and this figure drops to 50% for Design and Build projects. Interestingly, the use of novated Design and Build led to the worst quality outcomes.

- The client's expectations for quality are achieved with less well developed Employer's Requirements allied to the contractor's own staff, as opposed to outsourced staff, becoming involved from an early stage in developing the design.

As can be seen, a major factor impacting on the success of Design and Build is the degree to which the Employer's Requirements are developed. This factor dramatically affects the nature of Design and Build as explored further below.

2.3.3 Defining Design and Build

Having identified the historic context that led to the resumption of the Design and Build route, it is clearly necessary to identify its main constituents.

Masterman (1997), defines three main types of procurement system:

1. Separated and co-operative - Characterised by the segregation of design and construction.

2. Integrated - Design and construction are fused and undertaken by one organisation.

3. Management-orientated - The management of the operation is undertaken by one organisation, whilst the design and construction is let to individual package contractors.

Design and Build fits into the integrated category, and can be considered as a family of procurement routes. Masterman also identifies three main attributes that Design and Build packages share:

1. The responsibility for design and construction lies with one organization.

2. Reimbursement is generally by means of a fixed-price lump sum.

3. The project is designed and built specifically to meet the needs of the client.'

(Masterman, 1997:p 56)

The concept of the responsibility for design and construction being assumed by one organisation, is typically limited. This is due to three main factors: 1) The client needing advice from an impartial party, 2) the preparation of preliminary information to allow a tendering competition, and 3) the clients wish to develop the design and specification prior to contractor involvement. A client will typically employ consultants to help them develop the brief for the scheme, which leads to the production of outline drawings and a specification for the work, which are embodied in the Employer's Requirements. The contractor will then develop the design based on the Employer's Requirements, and then collate his response into the Contractor's Proposals.

This simplistic view can be considered the veneer on an extensive range of procurement options. For example, Akintoye (1994) notes six types of Design and Build, which can be considered extensive, except perhaps for the often-included Design, Build, Finance and Operate (DBFO) variety. The six types are shown below:

1. Traditional Design and Build - Contractor fully responsible for the design and construction.

2. Package Deal - Model buildings altered to the client's requirements.

3. Design and Manage - The contractor is responsible for the design and supervision of subcontractors, although unlike traditional, they are paid a management fee for their services.

4. Design, Manage and Construct - Similar to the above, the difference lies in their inclusion in the actual construction activities.

5. Novation - The client employs the services of a design consultant, who on appointment of the contractor, is assigned to them. This means that the original contract between the consultant and client is terminated in place of the new one between contractor and consultant.

6. Develop and Construct - The client employs a design consultant to stage D of the RIBA scale (scheme design). Once appointed, the contractor will complete the detailing and construction of the project.

The term Design and Build and its usage has led to much confusion in the industry (Chevin, 1993), with commentators differing on their views of what the term is applicable to. The different types of procurement route that are included under the design and build umbrella, differ between authors. For example, Janssens (1991) sees two main subdivisions, these being employer-led and contractor-led. At the extreme of the employer-led continuum, Janssens (1991), Masterman (1997) and Akintoye (1994) include Develop and Construct, a variant where the employer's consultants carry out almost complete design prior to the contractor becoming involved. Turner (1995) refutes its inclusion under the Design and Build umbrella: *'This is hardly design and build in concept and* *could lead to confusion of responsibilities...'.* Interestingly, Akintoye (1994) in his survey of 52 UK construction contractors, found that develop and construct was favoured by contractors, although the management-based versions were not favoured by contractors.

Later work by Akintoye and Fitzgerald (1995), which surveyed architects' perceptions of Design and Build, found similar results on the popularity of Develop and Construct, and the unpopularity of the management-based versions. Bennett *et al (*1996) conducted a large-scale review of Design and Build, and similarly incorporated Develop and Construct within their definition of the procurement route. They found that it was a major part of the Design and Build market, representing over 20% of the £1.25 billion of new construction work procured using Design and Build at the time. Turner's refutation would seem to hinge on the lack of a significant proportion of contractor design input in the case of Develop and Construct. Develop and Construct type derivatives of Design and Build, by limiting the dialogue and co-development between client and contractor, diverge from the reasons for adopting Design and Build, integration of design and construction and early involvement of the contractor. The relationship between client and contractor is key, as highlighted in the influential CIOB guidance:

> Almost without exception in D&B the contractor deals with the client direct. Where the client employs consultants it is preferable that they are used as advisers rather than agents. This direct contact with the client enables the contractor to have a first hand appreciation of the client's needs, his priorities and his controlling influences (CIOB, 1988:p. 6).

This understanding of Design and Build reflects the early calls for its adoption in favour of Traditional Contracting; one of integrating design and construction. The extent of pre-contractor design and specification development is the key element of the divergence within the Design and Build family.

The integrated structure of Design and Build, allied to the way it places the risk for design and construction at the door of the building contractor and is able to deliver greater integration between design and construction (including the ability to allow construction to begin prior to the design being completed), means that it lies at the centre of many modern procurement routes. For example, the Private Finance Initiative, (PFI), Public-Private Partnerships (PPP) and Local Improvement Finance Trust (LIFT), make use of aspects of Design and Build, but these procurement routes are outside the scope of this study.

2.4 Summary

This chapter has been broadly split into two parts in order to explore the nature of value and how this relates to Design and Build procurement; both of which lie at the heart of this thesis. The chapter commenced by defining value in terms of objective value, subjective value, value in use, value in esteem and value in exchange. It then introduced the concept of the value chain which shows how the demand for construction products stems from an organisation's strategic business planning process, itself comprising numerous individuals with different and often competing value systems. The value chain highlights the way the client's value system must be transitioned through numerous points in the supply chain, in order to realise value for the client. The construction procurement route plays a major part in how well the project value chain is maintained; the concepts of the value chain and transition points play a major part in the rest of the thesis.

The second part of the chapter provides a detailed understanding of Design and Build procurement. Construction procurement routes which segregate design and construction have been prevalent for many years and have led to widespread time, cost and quality problems. Many influential reports have extolled the benefits of integrating design and construction in order to reorientate the construction process to focus on the end customer, rather than the more limited sequential focus on the next point in the construction supply chain (Egan, 1998). Design and Build is a popular range of procurement routes which, owing to their essentially integrated nature, offer the potential to align the project value chain as the contractor has overall control.

Whilst there is an appreciation of the role integrated procurement plays in achieving overall value for money, by the way it more effectively allows value to be transitioned between the various supply chain parties involved in the project process, there is a lack of practical advice on how to successfully transition value between the different parties in Design and Build procurement, particularly at the important tender stage. The tender stage represents such a significant value transition point as it is the point at which the client’s value system is passed to the construction contractor. In Design and Build procurement, the tender stage is characterised as incorporating added complexity, when compared to Traditional Contracting. This is because in some variants, the various tendering contractors propose different solutions, or value propositions, to meet the client's stated value system.

The next chapter explores tendering in greater depth, particularly tender processes in Design and Build projects.

Chapter 3: Conceptual Analysis: Tendering and Supply Chain Management

3.1 Introduction

Having outlined how important the nature of the construction procurement route is in enabling transition points to effectively communicate the client's value system throughout the project process, this chapter commences by exploring what is perhaps the most important transition point; the tender process. The literature focuses on how the tender process represents a major value transition point between the client and the main contractor.

Design and Build tendering, the focus of this thesis, is presented as being particularly complex which has major implications for the effective transition of value. The problem is made worse as there is a distinct lack of practical guidance for those practitioners involved in Design and Build tendering. Such a limited knowledge base has the potential to seriously affect clients' ability to achieve value for money when using this increasingly popular form of procurement (Bennett *et al,* 1996). Moreover, the overriding focus on the first tier of the construction supply chain, in the form of the client-main contractor tender process, masks a multitude of different tender processes carried out throughout the other tiers in the construction supply chain. Of these, the numerous contractor-subcontractor tender processes are perhaps the most important, as they represent such a large proportion of the overall project expenditure and often include a design function.

Perhaps unsurprisingly, taking account of the lack of Design and Build tender guidance in general, these important parts of the project process are not accounted for in guidance literature. Taken as a whole, the paucity of detailed practically-grounded guidance for those involved in Design and Build tendering at different levels of the construction supply chain, can seriously affect the ability to realise value and achieve project success through the considerable investment channelled via this procurement route.

In order to contextualise current tender processes, this review commences by considering the major Government-sponsored reports, and other key works, which have impacted on tendering in the UK construction industry over the last 60 years. In the next section of this chapter, the different approaches to tendering are then outlined prior to moving on to focus on the tender processes involved in Design and Build procurement. Although the Design and Build tender process requires the input of the wider construction supply chain, existing literature focuses on the client and main contractor, and fails to address the wider supply chain, in the form of subcontractors, suppliers and consultants, in any depth. As such, Supply Chain Management (SCM) is explored, owing to its potential to tie together the client's value system through the myriad of different tender processes which take place at different levels in the construction supply chain.

3.2 Tendering

3.2.1 Development of Tendering in UK Construction

3.2.1.1 Simon Committee Report on the Placing and Management of Building Contracts (1944)

The Simon Committee Report, *the Placing and Management of Building Contracts,* was commissioned near the end of the Second World War at a time when Britain was ready to begin investing significant funds in rebuilding the war-torn built environment. The report was concerned with examining how effective the tendering procedures of the day were in meeting the objective of improving the placing and management of construction contracts. Open tendering, the most popular tendering mechanism at the time, was criticised for its simplistic focus on lowest capital cost evaluation as the sole discriminating factor between tendering contractors. Similarly, the inefficiency that this created in the market, where price inflation stemmed from various contractors investing significant time and resources in tendering for work, was condemned.

To combat the problems associated with open tendering, selective tendering was forwarded as an alternative, as it limits the amount of contractors tendering by discriminating between them on the basis of their performance potential prior to evaluating on the basis of capital cost. The industry heeded this message and the legacy of recommendations is still felt in UK construction where selective tendering has been popular for a number of years (NJCC, 1996a). Selective tendering was not seen as the only route to transform the effectiveness of placing and managing contracts; negotiation was championed as it offers the ability to form an early integrated team approach.

3.2.1.2 Banwell Committee Report (1964)

Perhaps one of the most influential of the industry change reports, the *Banwell Committee Report* (1964) clearly saw the greatest potential for change lying in procurement routes which integrate design and construction, making more widespread use of selective tendering, in addition to utilising alternative approaches to selection, such as serial tendering. This movement away from Traditional Contracting, a fractured and often adversarial procurement route, was driven by the problems that were so frequently encountered where it was used (as highlighted in chapter two of this thesis).

Following the recommendations of the *Simon Report (*1944), Banwell highlighted how little tendering practice had changed, as open tendering was still being utilised to meet a client’s key objective of selecting the contractor submitting the lowest capital cost. Similarly underpinning the popularity of open tendering, was the need for accountability in the expenditure of public funds. As open tendering distinguished between contractors solely on the basis of capital cost, local authorities used the approach to demonstrate transparency in their selection processes. Ironically, this was the reason it was so heavily criticised by Simon 20 years earlier.

3.2.1.3 Economic Development Committee for Building, Action on the Banwell Report (1967)

Adding its voice to the criticisms of open tendering, the report showed how open tendering was still the favoured selection process for government procurement. In 40 percent of all local authority housing construction investment, open tendering was being used to award contracts. Where selective tendering was being adopted, it was found that it was being carried out in ways that did not concur with its principles. For example, the report found that hospital bodies were using shortlists with as many as 12 contractors; hardly an efficient use of resources. In this respect, whilst tendering was being badged as selective, and incorporating the prequalification processes of selective tendering, it still led to the price inflation associated with open tendering.

3.2.1.4 Constructing the Team, Sir Michael Latham (1994)

The seminal *Constructing the Team,* came half a century after the publication of the *Simon Report* (1944) and still communicated the dual message of: 1) the importance of selective tendering in leading industry improvement and 2), that open tendering should not be carried out. Set against a backdrop of a heavily claims-conscious UK construction culture at the time, the report called for selection on the basis of overall value for money rather than lowest capital cost, Tenders should be evaluated by clients on quality as well as price' (Latham, 2004: p.viii). In contrast to the numerous different prequalification documents used by construction clients (many of which are client, consultancy and project-specific, and comprise a multitude of approaches of varying quality), a single prequalification document was proposed for public sector procurement.

Such a certificated prequalification system was believed to be a way to improve the rigour and efficiency of the selection process. Success at prequalification stage would lead to access to a single approved list for all public sector construction work. The resulting database, ‘constructionline’, provides details of over 15,000 national construction contractors and consultants for public and private sector procurers (constructionline, 2008).

Further tendering-related advice aimed at earlier team formation and reduced inefficiency included using two-stage Design and Build tendering and fewer contractors in competition on Design and Build projects.

3.2.1.5 Highlight Optimum Legitimate Tender (HOLT) Technique (1995)

The HOLT technique, whilst not being government funded or as high profile as the other reports discussed, can be considered a key development in tendering practice. It was developed over a number of years by Gary Holt and sets out a multi-attribute analysis (MAA) approach to contractor selection which includes the development of decision criteria matched to contractor attributes. The model is based on various problems which Holt’s long-term research identified with tendering practice:

1. Lack of Universal Approach - There are too many different approaches, which are often bespoke and kept private.

2. Long-Term Confidence in Pre-qualification - The majority of pre-qualification systems are ineffective, despite the organisations

administering them considering them to be effective over the long-term. Standing list access, which is gained through prequalification, is often not reviewed with sufficient regularity. In addition, the actual criteria used are often generic rather than project-specific.

3. Subjective Analysis - Holt recognises the practical problems of employing solely quantitative techniques, such as the difficulty of gathering information. However, it is logically argued that this problem should not be dealt with by turning subjective inputs into objective outputs, as was found to often be the case.

4. Final Selection and Tender Evaluation - Drawing on the relationship between lowest capital cost selection and project underperformance, Holt questions the National Joint Consultative Committee's advice to exclude qualified bids (NJCC, 1996a). In contrast, the important role that qualified bids play in civil engineering, is drawn on to call for their use in the non-civil construction arena.

Holt's work groups the following aspects within one overarching model: general qualification, project-specific qualification and final tender evaluation as seen in figure 3.1 overleaf.

a) Identify selection criteria

b) Identify contractors desirous to tender

c) Gather pre-qualification data

d) Apply data to pre-qualification criteria

e) Evaluate results and establish shortlist

Pre-qualification component

f) Invite tenders from contractors shortlisted

g) Gather secondary data from tenderers

h) Apply data to more specific criteria

j) Evaluate results and establish hierarchical

k) Evaluate the bid component of tenders

Tender evaluation component

l) Combine (j) and (k) to establish final

m) Choose contractor

Final selection component

Figure 3.1 Framework for the stepwise logic model (adapted from Holt, 1995)

3.2.1.6 Construction Industry Board, Code of Practice for the Selection of Main Contractors (1997)

More practical in nature than many of its forebears, this code of practice was aimed at reducing tendering waste, such as duplicated processes, in order to increase overall industry efficiency and client satisfaction. The code is an output of Working Group three of the Construction Industry Board (CIB), which was established to help implement the recommendations incorporated in

Constructing the Team which came three years earlier (Latham, 1994). Incorporating ten qualification criteria, the work considers both generic non-project specific criteria, and project-specific criteria, before dealing with the final assessment. The document states that the following good practice principles should be adopted during the appointment of contractors:

- clear procedures should be followed that ensure fair and transparent competition in a single round of tendering consisting of one or more stages
- the tender process should ensure receipt of compliant, competitive tenders
- tender lists should be compiled systematically from a number of qualified contractors
- conditions should be the same for all tenderers
- confidentiality should be respected by all parties
- sufficient time should be given for the preparation and evaluation of tenderers
- sufficient information should be provided to enable the preparation of tenders
- tenders should be assessed and accepted on quality as well as price
- practices that avoids or discourage collusion should be followed
- tender prices should not change on an unaltered scope of works
- suites of contracts and standard unamended forms of contracts from recognised bodies should be used where they are available
- there should be a commitment to teamwork from all parties.

(CIB, 1997: p.5):

As can be seen, the advice is based around a rigorous process, where tenderers are given sufficient information and time to tender for works administered on unamended forms of contract. However, whilst these principles can undoubtedly be considered to represent ‘common sense’, the work clearly lacks a discussion of what’s needed to develop the recommendations.

3.2.1.7 Construction Industry Research and Information Association, Selecting Contractors by Value (1998)

Reflecting the increasing importance of value-based selection in UK construction, the report promotes the need to select contractors on their ability to add value to projects. The approach set out begins with the need to understand the client's value system, and outlines eight key selection criteria to form the basis of evaluation. The work responded to the value-based selection , which had started to become prevalent some years earlier. Achieving value from projects was dealt with by first considering what constitutes value, then identifying opportunities for contractors to add value and making this the main value criteria. The report recognises the need for financial accountability and flexibility of approach.

> The assessment method set out in these Guidelines is intended to provide a system which will enable clients to strike the right balance between quality and price. In particular it will meet the requirements of clients who need to demonstrate financial accountability and comply with policy which requires competition whilst still ensuring that proper account is taken of the need for quality in order to obtain 'best value for money'. However, no two projects are the same and the method therefore needs to be used flexibly to take account of the particular circumstances of each case (CIRIA, 1998: p. 3).

Interestingly, the work incorporates an early reference to SCM is incorporated, as shown below, in a list of the eight selection criteria the report proposes to be used:

1. Technical knowledge and skills.
2. Management skills including time, cost, value, quality, risk, safety, health and the environment.
3. Effective internal organisation.

4. Collaborative culture.

5. Appropriate human resources.

6. Supply chain management.

7. Financial resources.

8. Broad indicators.

Once more, the work suffers from a lack of methodological discussion, which makes it difficult to determine whether it can be considered trustworthy. For example, the report states that it is based on studies structured in three phases which incorporate field studies and structured interviews of clients, consultants and contractors. In addition, workshops and a final review by industry organisations are all incorporated and are overseen by a steering group. However, the work lacks any deeper exploration of these issues.

3.2.1.8 Rethinking Construction, The Report of the Construction Industry Task Force, Sir John Egan (1998)

> too many clients are undiscriminating and still equate price with cost, selecting designers and constructors almost exclusively on the basis of tendered price. This tendency is widely seen as one of the greatest barriers to improvement. The public sector, because of its need to interpret accountability in a rather narrow sense, is often viewed as a major culprit in this respect. The industry needs to educate and help its clients to differentiate between best value and lowest price (Egan, 1998: p7).

As can be seen, the importance the report gives to tendering is clear. Arguably a landmark report, the agenda set out is based on techniques developed in the manufacturing sector and includes five drivers of change:

1. Committed leadership.

2. A focus on the customer.
3. Integrated process and team around the product.
4. A quality-driven agenda.
5. Commitment to people.

It advocated that tender processes should consider how best to select the wider construction supply chain including contractors, designers and suppliers. The report was based on the belief that many tender processes being used at the time, represented a barrier to teamworking, learning and innovation. It added a substantial voice to industry change discourse, as it forwarded the view that construction should adopt a manufacturing-style approach to production, which integrates the supply chain around processes and products, using a team approach. Briscoe and Dainty (2005) investigated the problems involved in integrating the supply chain in the UK construction industry, and were clear about their belief that the differences between manufacturing and construction has led, and would continue to lead, to slow change:

> While the Egan agenda seeks to make UK construction more like the manufacturing sector, the differences probably mean that it will take a much longer time to achieve the same levels of integration' (2005: p.235).

Briscoe and Dainty (2005) conducted over 100 semi-structured interviews with representatives from client (from public transport, vehicle manufacturing and telecommunications sectors), contractor and subcontractor organisations. The clients came. The pair state that all interviews were transcribed verbatim and analysed using Computer Aided Qualitative Data Analysis Software (CAQDAS), which represents a large data set for such fine-grained analysis.

3.2.1.9 Accelerating Change, Strategic Forum (2002)

Building on and reaffirming the principles set out in *Rethinking Construction,* this similarly important report reinforced the importance of tendering, as John Egan sets out:

> I wish to see an end to lowest cost tendering as the main procurement tool of this industry and to replace this wasteful and unpredictable process with one where clients procure value for money against world class benchmarks and projects are delivered by integrated teams of experts involved in continuous improvement in customer satisfaction, productivity, safety and value for money (2002: p.7).

As with *Rethinking Construction* (1998), one of the report's central messages is the need to integrate clients and suppliers, through Supply Chain Management to create value. Briscoe *et al* (2004), taking their cue from *Constructing the Team* (1994), *Rethinking Construction* (1998) and Accelerating Change (2002), examined the extent to which the client can influence such supply chain integration using a case study approach based around three client organisations. Their findings concurred with the principles laid down in *Accelerating Change* (2002); that client action was 'needed to make integrated teams the norm across the industry and their focused objective should be creation of added value to the project' (p.200).

However, Briscoe *et al* (2004) are less sure that the vision of fully integrated teams as laid out in *Accelerating Change* (Strategic Forum, 2002) is achievable:

> Whilst the proposals in Accelerating Change to develop integrated teams and mobilise value streams are very welcome, the achievement of such fully integrated supply chains may well prove difficult to realize, even for powerful and experienced clients (Briscoe *et al,* 2004: p.2004).

Interestingly, the nature of the client sample group, and overall methodological approach, comprised of clients from public transport, vehicle manufacturing and telecommunications sectors. This is the same tripartite group of secondary large high-expenditure clients included in the research carried out by Briscoe and Dainty (2005). The 2005 work offers a degree of comfort that triangulation of findings has occurred, by virtue of the following statement:

Three different client organisations took part on the research, each of which facilitated access to various companies operating at different tiers in their construction supply chains (Briscoe and Dainty, 2005: p.321).

More specifically, the research states that over 100 interviews were carried out with 'senior staff in client, main contractor and subcontractor (supplier) organisations' (Briscoe and Dainty, 2005: p.321). However, the work carried out by Briscoe *et al* (2004), despite outlining a similar methodology, and client sample type and overall sample size, makes no reference to contractors or subcontractors being included in the study. As such, it makes it difficult to gauge how well triangulated the findings are, and as such may cast doubt over the veracity of the belief that clients should lead the creation of integrated teams.

3.2.1.10 OGC Procurement and Contract Strategies (2007)

This report echoes many of the sentiments of its forebears in determining how to utilise procurement routes which integrate design, construction, operation and maintenance, to provide value for money for public-sector projects:

The primary consideration in the procurement of projects is the need to obtain best value for money in the whole life of the service or facility. The design and operation of the facility should maximise the delivery of effective public services; this is most likely to be achieved through integration of the design, construction, operation and ongoing maintenance (OGC, 2007: p. 2).

The report aligns with Government policy of procuring projects using its preferred procurement routes of the Private Finance Initiative (PFI), Prime Contracting and Design and Build, which have been in place since April 2000. It provides advice for procuring bodies to enable them to meet the Government's Achieving Excellence Initiative; itself formed in March 1999 to improve the performance of central government departments and their executive Agencies, in addition to Non-Departmental Public Bodies (NDPB).

Taking a procedural approach, the guide sets out a procurement process structured around a Gateway Review Process (GRP), aimed at selecting an integrated supply team. Advocating the use of output specifications, the guide suggests the contractor selection criteria should include the following:

- Previous performance on teamworking as part of an integrated supply team.
- Previous performance of supply chain management, including current teamwork and partnering arrangements between members of the integrated supply team.
- Evidence of the skills/abilities of individual members of the supply team.
- Project-specific supply chain management proposals.

(OGC, 2007: p.14)

The inclusion of SCM, as a central aspect of procurement routes (which seek to integrate design, construction, operation, and ongoing maintenance), in order to provide the client with value for money, epitomises contemporary 'best practice' discourse. However, the guide lacks a detailed elaboration of the tender process for Design and Build procurement, which could have logically fitted as a subset of the GRP. The accompanying best practice briefing guide, *Value for money in complex procurements* (OGC, 2002), also lacks detailed tender guidance.

This brief tour of the key best practice literature, has given a flavour of the changing nature of construction improvement discourse. Central themes include the continued importance of the tender process and the need to integrate design and construction. Tendering cuts at the heart of the project process and this review of literature, have highlighted the continuing importance tendering has received over the years. For example, the overriding criticism of open tendering, coupled with advice to adopt selective tendering, was a central message in the early reports. The need to reduce the size of tender lists, owing to the way this can minimise the use of resources, and similarly limit upward price inflation, has also been a recurring message. Similarly, the design and rigour of the prequalification component of selective tendering, and more specifically, the development of appropriate selection indicators, are embodied within the best practice principles.

The importance of overall value, both in terms of identifying the client's needs, and selecting contractors at tender stage on their ability to add value, has emerged as a central tenet of construction best practice discourse. This way of matching the client and the contractor through a tender selection process driven by a focus on overall value for money, corresponds with the need to understand the client's value system and ensure it is effectively communicated at perhaps the most important transition point; the tender stage. The call to select contractors on the basis of overall value for money, has led to the development of price and quality mechanisms, which balance a myriad of factors in the final selection.

By reviewing and reflecting on the literature presented, there are two important omissions in the body of literature: 1) a lack of practical guidance for those involved in Design and Build tendering, and 2) an overriding focus on client-led initiatives focusing on the first tier of the supply chain. Integrated procurement routes, such as Design and Build, have increasingly been advocated owing to the belief that their ability to integrate design and construction can lead to better overall project performance. Allied to this is the way that the tender process has been identified as a crucial component of project success. However, despite the acknowledgement of the specialised nature, and difficulty of tendering, for Design and Build projects, there has been a lack of guidance for practitioners involved in tender processes associated with this procurement route.

The need to integrate the project team, and ensure the wider supply chain is involved in the project from as early as possible, has led to the message to adopt SCM becoming a repeated core theme in recent reports. Nevertheless, whilst the reports include useful guidance (albeit often lacking the practical detail required to implement in practice), their overriding focus on the first tier of the supply chain, in the form of the client-main contractor tender relationship, fails to take account of the wider construction supply chain. For example, for every tier one client-main contractor tender process, there will be a much higher number of main contractor-subcontractor tender processes. Taking account of the need to transition client value through the wider supply chain, this lack of detailed guidance has serious implications for overall project success. These issues will be explored in greater depth in the remainder of this chapter. First, attention turns to explore tendering mechanisms culminating in a focus on Design and Build tendering. Second, SCM is explored in greater depth with particular reference given to the dominant client-centric discourse which has developed in the body of UK construction literature.

3.2.2 Tendering Mechanisms

3.2.2.1 Open Tendering

Open tendering does not impose any limit on the number of contractors able to tender and as such is based on the free market competition principle: costs are reduced by increasing competition. It broadly follows a process of:

1. The project details are advertised with a request that interested parties, who are able to satisfy the stated requirements, apply for the tender documents.
2. The process of requesting documents may include the additional step of the payment of a bond from interested tenderers, after which point the documents are released.
3. The tendering contractors are required to submit their bids by a stipulated date. Following submission, their tenders are generally evaluated on the basis of the lowest compliant capital cost.

Advantages include the avoidance of the time and costs associated with prequalification for those administering the tender process and the accountability benefits that stem from solely differentiating on tender cost. Disadvantages include contractors actively pursuing claims-generative practice once they are appointed, so that they can increase the price of their unrealistically low tender prices. In addition, the waste of resources associated with so many organisations tendering is problematic and can lead to general price inflation in the market, as contractors spread their increased cost base on other projects.

Baker and Osraah (1985), found that open tendering was used by 14.9 percent of clients. Holt *et al* (1996), carried out research on different types of tendering and found that open tendering had begun to make a resurgence in popularity; an interesting finding when one considers the high-profile criticism of open tendering which has been so prevalent in the construction industry over the last 60 years (Simon, 1944; Emerson, 1962; Banwell, 1964; Latham, 1994). Popular opinion in the United States, where open tendering is termed the ‘low-bid method’, and was extremely popular in public procurement, led to a change in public procurement practice. Instead of being viewed as a way to reduce costs, it became sidelined as procurers sought to select on the basis of overall value for money. Research in the United States found the approach was associated with ‘extensive delays in the planned schedule, cost overruns, very serious problems in quality, and an increased number of claims and litigation’ (Herbsman and Ellis, 1992: p.142). Research on tender practices emanating from the USA has, in the recent past, been dominated by the need to change this low-bid philosophy through such practices as multiparameter bidding (Herbsman and Ellis, 1992), and competitive approaches to average bidding methods (Ioannou and Leu, 1993). Molenaar and Songer (1998) identified three main methods for selecting tenderers in the United States public sector:

1. Price only.
2. Qualifications only.
3. Combination of price and qualifications.

Their study found that the third option was most effective in meeting customer expectations. In addition, short-listing of contractors was found to enhance performance and the use of a qualification-only system was successful at lowering the administrative burden of the project.

As open tendering does not take account of time and quality issues, it is unable to support a drive to select on the basis of overall value for money. Similarly, the approach does not include an overt mechanism to take account of the tenderers own input into value generation, as the evaluation is so heavily reliant on simple compliance with the clients requirements (as outlined in the tender documents). These problems, allied to claims-conscious practice and bid-rigging, make the increasing calls to stop using open tendering easy to understand.

3.2.2.2 Selective Tendering

Selective tendering is substantially different to open tendering as it employs a prequalification process, which screens organisations wishing to tender, by requiring them to meet or exceed predetermined criteria. Prequalification is intended to reduce the probability that an organisation who cannot meet the client's articulated performance thresholds, will win the tender competition and be selected to carry out works. Gaining qualified status generally enables a contractor to tender for either one project or, in situations where qualification leads to access to a standing list, for numerous projects in a predetermined timeframe. The JCT *Practice Note Six* (2002) and the National Joint Consultative Committee (NJCC, 1995; 1996a; 1996b) incorporate frameworks for selective tendering. The criteria used in the qualification process will likely follow a standard template developed over time, and possibly by referring to industry and academic reports.

It should be noted that there is some inconsistency over the usage of the terms 'prequalification', 'selection' and 'award'. For example, the HM Treasury (1999a) uses the term 'selection process' to describe what is generally known as the prequalification process. Prequalification is more widely used to describe the initial screening and filtering process.

Russell (1996) defines prequalification as a process where:

> ...an owner, or a team of qualified individuals whom the owner designates for the task, screens the candidate contractors according to a given set of criteria *before* any competitive bidding or price negotiation occurs. The goal of this screening process is to determine a constructor's competence and capabilities to perform the work if the owner awards the organisation the contract (Russell, 1996: p.1-2).

This view of prequalification, as a type of filter process, is useful as it shows the importance of developing and applying different prequalification criteria. Prequalification is carried out in two ways based on either:

1. General criteria - Either forming the initial part of the prequalification process or to gain access to a standing list.

2. Project-specific criteria - These criteria are developed to reflect the needs of the individual project.

In practice, prequalification should be developed to incorporate both generic and project-specific criteria. The *NJCC Design and Build Tender Code* (1995) advises consideration of the following issues for works procured using this particular route:

- the firm's financial standing and record;
- whether the firm has had recent experience of designing and constructing the type of building envisaged by the Employer's Requirements under conditions similar to those imposed by the employer;
- whether the contractor's customary design capability is in-house, and if not, what method will be used in order to provide a design capability;
- the firm's general experience and reputation in the area in question;
- whether the management structure of the firm is adequate for the type of contract envisaged; and
- whether the firm will have adequate capacity at the relevant time.

(NJCC, 1995: p. 4)

These criteria demonstrate how the nature of the procurement route, and the corresponding service required from the contractor, affect the prequalification criteria. For example, the requirement to consider whether the contractor has recent experience designing, and constructing, where the nature of the contractor's design resource is specific to Design and Build procurement. Interestingly, the NJCC Design and Build Tender Code (1995) does take account of the wide variety of projects falling under the Design and Build umbrella:

> …depending on the nature of the project, the design content that is delegated to the contractor may vary greatly (NJCC, 1995: p. 1).

The need to ensure the prequalification criteria are effectively incorporated into the wider tender process, and directly related to the client's value system, is underlined in Hatush and Skitmore's research which identified a need to:

> improve and organise the assessment of information relating to these criteria, and to develop methods for evaluating the criteria against the owner's goals in the pre-qualification and bid evaluation stages of the procurement process (Hatush and Skitmore, 2007: p.36).

Despite the benefits of being able to select from a number of contractors, who have been screened for their ability to meet the client's needs, selective tendering does have several drawbacks according to Griffith *et al,* (2003):

1. The evaluation process, including keeping standing lists current and correct, requires time and resources. For instance, local authorities are likely to keep standing lists for a high number of different contractors, which may require a significant resource allocation, both from the local authority, and the different contractor's, to keep current. An up-to-date list is likely to be required, irrespective of the identifiable availability of work.

2. The greater subjectivity associated with selecting on non-cost criteria, means that it is harder to demonstrate public accountability. Where cost,

as a simply determinable objective measure, is used as the sole criterion, it is simple to demonstrate the contractor submitting the lowest price.

3. The selection criteria may be too generic and not appropriate to the specific project. Where the assessment is limited to generic criteria, the opportunity to mould the selection process around the specific project is lost. This may, for example, become a problem where internal processes fail to give sufficient priority to developing project-specific criteria, or where resources are stretched leading to development being overlooked.

4. The competitive element is correlated with the number of tenderers; as selective tendering reduces this number, competitiveness can, in turn, be decreased. This simple logic underpins competitive practice. However, the cost to the client of administering the tender process, and the multiple contractors who take part, is a cost which must ultimately be borne by the industry. Inefficient use of resources leads to general price inflation.

Despite the way in which selective tendering considers the client-contractor tender transition point from a quality perspective, the adoption of this important message into the wider construction supply chain, is less evident. Building on the work of Baker and Osraah (1985), Hatush and Skitmore (1997) reported that, whilst subjective evaluation methods were increasingly being adopted, lowest priced tender submission was selected 'irrespective of the technical, financial, managerial and security information available' (1997: p.32).

Selective tendering follows the structure of either being single stage, or two-stage, as explored below.

i) Single-Stage Selective Tendering

Being the simplest form of selective tendering, single-stage requires that the client (or the client's advisors), select a contractor, from a list developed in one of two ways: 1) from a discrete prequalification process, or 2) developing from a standing list. The contractor is generally evaluated on the basis of the lowest compliant capital cost. Where project-specific prequalification is used, as opposed to a standing list, it is important that the prequalification criteria reflect the client's value system. The prequalification process generally culminates in a yes, or no, binary decision, after which point the NJCC (1996a) believes evaluation on lowest capital cost criteria is sufficient. This is an important point, as the belief that a lowest capital cost evaluation is sufficient following prequalification, can be seen to only partially embrace the industry's increasing calls to select contractors on the basis of overall value for money. For example, it does not concur with advice to select contractors based on their ability to add value (CIRIA, 1998). Statistics showing the popularity of the different approaches are rare; the last reported usage figures date from the mid 1980s and highlight the popularity of single-stage tendering when it was used in 40.4 percent of cases (Baker and Osraah, 1985).

ii) Two-Stage Selective Tendering

Two-stage tendering enables the contractor to become involved earlier in the project cycle and as such is particularly appropriate for Design and Build projects. As has been made clear in this thesis, the benefits available to those involving contractors early in the project cycle, have been widely advocated (CIOB, 1988; Jannsens, 1991; Latham, 1994; Bennett *et al,* 1996). JCT *Practice Note Six* (2002) advises that two-stage tendering should be used on:

> ....large or complex projects where close collaboration with the contractor during the design stage will assist the search for the best solution for the employer in terms of cost, programme and design (JCT, 2002: p. 12).

Whilst two-stage selective tendering includes a myriad of different approaches, they all adhere to the same basic framework of selecting a preferred contractor at stage one, and developing the design which culminates in the award of the contract at stage two. Stage one, which may follow the prequalification of a number of contractors, includes competition which generally takes the form of pricing preliminary items, profit and overhead allowances, and possibly pricing a schedule of rates reflecting aspects of the scheme. The amount of work required by the contractor to develop the stage one tender can be quite substantial. Following stage one, a preferred contractor is selected, although no contract is agreed at this point. The preferred contractor works with the client and consultants to develop the scheme during stage two and the prices that the contractor submitted in stage one are used to price the developing scheme of works.

Whilst there has been a distinct lack of recent research into two-stage tendering, previous research has highlighted various benefits. For example, the *Wood Report* (Wood, 1975) explored 48 projects using two-stage selective tendering. It found that the use of two-stage approaches led to the least time overruns of all approaches. They argued that this benefit stemmed from the contractor and consultants forming an early team approach, which led to better planning of the construction stages. Additional benefits of two-stage tendering includes reduced variation cost, whilst disadvantages can include an overall price premium and the possibility that unscrupulous contractors may employ cost-raising tactics during the second stage (Masterman, 1997).

3.2.2.3 Negotiation

Negotiated tendering incorporates a wide and diverse range of approaches including single projects and multi-project frameworks. Competition between different contractors is either partially, or completely, limited under this approach to selection. It generally includes one contractor working through the development of the project with the client and their advisors.

The *Code of Practice for the Selection of Main Contractors* (1997) believes that competitive tendering may be inappropriate:

> ...when works or services are required urgently and there is not enough time to complete the competitive process correctly (CIB, 1997: p.8).

Turner (1995), believes that there are two key reasons for clients to use competition between numerous contractors: 1) there exists an economic argument as more contractors competing to win work should equate to reduced costs and 2), that competition will lead to more design ideas being generated by the competing contractors. However, whilst there are numerous reasons for clients to use competition, the opposite is true for contractors as Turner makes clear:

> For the contractor, there is a prima facie economic argument against competition. It is not just the odds against him securing the contract, but the level of expense involved in designing in enough detail to be able to prepare the tender (Turner, 1995, p. 106).

For Egan (1998), competitive tendering should be replaced wholesale:

> The industry must replace competitive tendering with long term relationships based on clear measurement of performance and sustained improvements in quality and efficiency (Egan, 1998: p.5).

The usefulness of such ‘best practice’ advice has been questioned by Cox and Ireland (2002). The pair believe that rejecting traditional adversarial buyer relationships, and replacing them with long-term collaborative approaches, are misguided when implemented on all projects. Unfortunately, the trustworthiness of their approach is difficult to assess, as their research makes no reference to empirical evidence or methodological approach. Their work is drawn on in later parts of this chapter.

Having explored various different approaches to tendering, focus now turns to specifically consider tendering in Design and Build projects. The preceding tour through the different tendering arrangements has laid the foundations necessary to consider the focus of the thesis; Design and Build tendering. As the Design and Build procurement route is advocated as a way to help the client's value system be more effectively transitioned through the project cycle, it is essential to explore the tender process in more detail.

3.2.3 Tendering for Design and Build Projects

Traditional Contracting tendering generally follows the relatively simple single stage selective tendering format of prequalification, followed by a number of contractors pricing a developed, or partially developed, scheme of works complete with drawings and a Bill of Quantities. Design and Build tendering, on the other hand, is widely presented as being substantially different (CIOB, 1988; NAO, 2001; JCT, 2002).

The basis for evaluating each contractor's tender is the same in Traditional Contracting, as all contractors are tendering on the same developed scheme of works, as embodied in the tender documentation. However, Design and Build is presented as requiring all contractors to develop their own solution to the client's needs resulting in a 'design competition' at tender stage (CIOB, 1988). The National Audit Office (2001) description of Design and Build, underlines the intent for early contractor involvement and design development:

> clients have to specify the type of building they require in terms of the outputs and services it is intended to deliver and the contractor proposes the best design to meet this (NAO, 2001: p.25).

The way the contractor manages, and takes responsibility for, the design and development work in Design and Build, is the key distinction when compared with Traditional Contracting, which involves the client's consultants carrying out this work. Ashworth (1996) summarises this difference:

> With a Design-and-Build arrangement, the client instead of approaching architects for a separate design service, chooses to go directly to the contractor for the all-in design and construction commission (Ashworth, 1996: p.243).

As each contractor develops their own proposal to meet the client's needs, this substantially modifies, and adds complexity to, the tender process as the ability to compare 'like with like' is removed. The proposals will differ based on the amount of pre-contractor design and specification development. An overriding theme in the major industry change reports, is the need to allow contractors flexibility in meeting the client's needs by the use of output specifications (NAO, 2001). The nature of the tender competition is important; particularly the phasing of the development work. For example, with two-stage tenders, the first stage is likely to involve only minor contractor-led development work (if indeed any development work is carried out at all) as the preferred contractor develops the scheme in stage two.

The way in which Design and Build tendering is presented in the literature, fails to take account of the different types of Design and Build and how they each modify the nature of the tender process. Design and Build can be considered a family of procurement options, which differ in many ways including on the basis of the amount of design and specification development carried out prior to the contractor becoming involved. This is an extremely important point in terms of the tender process. For example, reference to Akintoye's (1994) inclusion of Develop and Construct as a type of Design and Build, makes the situation clear.

As Develop and Construct is defined as involving the client employing consultants to develop the design to RIBA stage D, this diverges from the way Design and Build tendering is presented as evaluating different contractors' interpretation of the client's needs. Developing the design to RIBA stage D means that contractors will not be required to develop their own designs.

3.2.3.1 Identify Weight and Rate

Where an arguably 'purer' form of Design and Build is used, with little or virtually no design and specification development carried out prior to tender, a single-stage tender process needs to differentiate between the contractors' alternative bids as with a classic design competition. In situations such as these, where the difference between the partially developed proposals needs to be considered, multi-attribute analysis (MAA) tender assessment techniques can be used. The typical underlying principle of the tender evaluation strategy is the 'identify, weight and rate' system as propounded by Jones (1984), Janssens (1991), Songer *et al* (1994) and Turner (1995). This consists of the client (possibly with the help of their advisors), deciding what is important to them (identify), and then systematically weighting it relative to the project whole criteria (weight), before rating the proposal submitted.

The United States has suffered from a lack of practical advice relating to Design and Build tendering, with a notable exception being the work by Songer *et al* (1994). This work is based on the contents of a Design and Build process model designed for the US Army Corps of Engineers (USACE). The work is notable for its detailed presentation of the development and implementation of evaluation factors. The key points are shown in figure 3.2 and expanded on below:

;:;: A):;Development Of evaluation factors::

i) Determine evaluation factors

ii) Establish quality structure

::::;: ;B) Implementation; o f evaluation: factors::

i) Develop evaluation teams

ii) Conduct actual evaluation

Figure 3.2 US Army Corps Evaluation Process (based on Songer *et al,* 1994)

Development of evaluation factors

i. Determine evaluation factors - Bespoke. Identify and define properties to allow examination and rating on quality or performance by the evaluation team.
ii. Establish quality structure - '...developed to award quality value for desirable properties and performance identified in the RFP (request for proposal - similar to the employer’s requirements) that surpass the minimum requirements specified. The assessment structure usually consists of "weights" assigned to each evaluation factor. The distribution of the weights reflects the priorities of the specific projects in question'.

(1994: p. 112)

Implementation of evaluation factors

Aim: To identify the most advantageous proposal and recommend it.

1. Develop evaluation teams - Evaluation of both technical and managerial aspects. A variety of member backgrounds is required, with no one person allowed to preside on both teams. In addition, no team member is

allowed to discuss specifics with the other team. Familiarity with the RFP is required, as are pre-evaluation meetings to increase project familiarity.
2. Conduct actual evaluation - 'Proposals are evaluated against selected RFP requirements. They represent the most important features of the specific project being evaluated. ..it is not feasible to verify conformance with all RFP requirements and criteria' (this occurs throughout the evaluation and drawing review stage).
3. Fairness - 'Price information and proposer identification are excluded from technical evaluation documents.'

(1994: p.112)

The rather prescriptive system can be applauded given the dearth of detailed information regarding tender evaluation in Design and Build. Essentially, it proposes a systematic framework for the comparison of disparate bids. It breaks client needs into identifiable elements, then stacks them in order of importance such that they can be applied to the project. The initial identification of the client's needs (the briefing process), is critical to determining the success of the overall project.

3.2.3.2 Cost and Timing of Tendering

The cost of tendering for Design and Build projects is one area that has been continually highlighted as a disadvantage. Turner (1995), contends that one way of reducing the high tendering costs for contractors, is to use a two-stage tendering process. The length of the tender period is also an important variable in the tendering cost equation. Turner (1995), CIOB (1988) and the CIB (1997) recognise that too short a period can lead to omissions and mistakes in the tender proposal. It seems obvious to suggest that too long a period conversely can lead to more work being involved and correspondingly higher costs for the contractors.

As previously highlighted, there is a lack of practical guidance for those involved in administering and taking part in Design and Build tender processes. However, this problem is magnified by taking account of the different forms of Design and Build which impact heavily on the type of tender process required. There is clearly a lack of well-articulated tender guidance for the variety of procurement routes incorporated within the Design and Build umbrella.

3.3 Supply Chain Management

The following definition draws attention to the integrative, value-adding and customer-focused aim of SCM:

> Supply Chain Management is the integration of key business processes from end user through original suppliers that provides products, services, and information that add value for customers and other stakeholders (Lambert et al, 1998: p. 1).

As can be seen, the focus is on integration and creating value for the customer, and other stakeholders, illustrating the market-focused, rather than supplier-focused, nature of SCM (Christopher, 1998). Supply chain rhetoric often refers to the importance of integration, indeed it is often taken as a given without further consideration. The case for integration is based on the recognition that many supply chains are overly complex and fail to optimise profitability and performance because of the conflicting interests, including specific wants, perceived needs and expectations, of the chain members (Sabath and Fontanella, 2002). Different members are focused on reaching their individual goals at the expense of the chain goal of meeting the customer’s needs. Such 'discontent' in the supply chain stems from six key interrelated factors as shown in figure 3.3:

Sources of Supply Chain Discontent

Member A (Supplier)	**Discontent**	**Member B (Retailer)**
Strategic Objectives	A - Incongruence	Strategic Objectives
Performance System	B- Disintegration	Performance System
Decision Authority	C - Misrepresentation	Decision Authority
Private Information	D - Distortion	Private Information
Incentives (Revenue and Costs)	E - Misalignment	Incentives (Revenue and Costs)
Internal Business Processes	F - Fragmentation	Internal Business Processes

Figure 3.3 **Sources of Supply Chain Discontent** (Simatupang and Sridharan, 2005)

Solutions to the problems include: mutual strategic objectives, appropriate performance measures, information sharing, decision synchronisation, incentive alignment and streamlined business processes (Simatupang and Sridharan, 2005). SCM has become increasingly popular across a range of industries over recent years as companies strive to increase their competitive advantage. Its spread in popularity has coincided with an increasing drive to add value rather than more narrowly aiming for cost reductions.

3.3.1 Construction Supply Chain Management

SCM's popularity in the construction industry has been helped by it being advocated as a performance-improving management framework in the major best practice industry reports over the last ten years (Holti *et al,* 2002; Strategic Forum, 2002; CBPP, 2003; OGC, 2007). The Government was so interested in introducing SCM that the Defence Estates, Ministry of Defence and the Department of the Environment, Transport and the Regions, sponsored the Building Down Barriers (BDB) initiative aimed at establishing SCM principles for the construction sector (Holti *et al,* 2000). Similarly, the Joint Contacts Tribunal (JCT) worked with Constructing Excellence to develop the *JCT Constructing Excellence Contract* (2006), based on the need to integrate the supply chain:

> The JCT - Constructing Excellence Contract has been drafted to provide a document that underpins collaborative working and the formation of integrated teams within the supply chain The Approach is based on the premise that the identification, collaboration and management of the complete supply chain is essential to the eradication of waste and the successful delivery of a project (JCT, 2006: p.1).

Notwithstanding, such fervent advocacy has been met with few voices of dissent (Green, 1999; Mouritsen *et al,* 2003). Green (1999), makes clear his belief that the SCM change agenda is founded and perpetuated on a diet of dogma and rhetoric:

> ....less scholarly ‘best practice’ literature frequently ignores the structural barriers to SCM, preferring to concentrate on the need for ‘culture change’ (Green, 1995: p.579).

Approaching SCM with a critical eye, in this way, challenges the simplistic calls for increasing industry performance through the adoption of an approach characterised by such difficult to ‘pin down’ terms such as relationships, collaboration, culture and integration. Supply chain rhetoric often refers to the importance of integration; indeed it is often taken as a given without further consideration. The centrality of integration to the BDB approach to SCM is underlined in the following statement which draws attention to the relationship between integration, SCM and Design and Build procurement:

Supply chain integration is the cornerstone of the BDB approach. It is important to realise that the supply chain needs to be integrated in two complementary senses:

- Those who design and those who construct and deliver need to be brought together.
- The supply chain needs to be kept together over time, from project to project.

(Holti *et al,* 2000: p. 12)

As has been stated, the case for integration is based on the finding that many supply chains are overly complex and fail to take account of the different and often competing needs of the different organisations in the supply chain (Sabath and Fontanella, 2002). However, if we look more closely at the issue of fragmentation, it becomes clear that it is a much more complex issue. For example, Atkins (1993), found that whilst fragmentation prevented the exchange of information, technology and adoption of common standards, it also related to the increasing specialisation seen on complex projects. This finding concurs with *Rethinking Construction* (Egan, 1998) which stated that fragmentation was both a positive and negative factor.

It was seen as positive in terms of specialisation and the inherent flexibility needed to deal with fluctuating demand patterns. However, at the same time specialism was seen as negative because of the way that subcontracting increases the importance of the contract, in addition to removing the ability to transfer teams. Egan's call for integration was based around removing the sequential nature of the construction process and refocusing the efforts of the team, and the required processes, on the end product:

> The conventional construction process is generally sequential because it reflects the input of designers, constructors and key suppliers. This process may well minimise the risk to constructors by defining precisely, through specifications and contracts, what the next company in the process will do. Unfortunately, it is less clear that this strategy protects the clients and it often acts as an effective barrier to using the skills and knowledge of suppliers and constructors effectively in the design and planning of the projects The key premise behind the integrated project process is that teams of designers, constructors and suppliers work together through a series of projects, continuously developing the product and the supply chain, eliminating waste in the delivery process, innovating and learning from experience (Egan, 1998: P 19).

The importance given to integration is underlined when one considers that the report stressed that the customer can benefit from increased value through an integrated project process based around the four elements of: product development, project implementation, partnering the supply chain and the production of components stresses. SCM was highlighted by Egan (1998) as one of the central ways to drive integration and deliver customer value. Its position as one of the report's key messages makes this clear:

> Just as client action must support the development of integrated teams, and their supply chains, to achieve maximum value and optimum performance, the creation of value should be a focussed objective of integrated teams (Egan, 2002: p.24).

However, for London (2008), the way that integration is proposed as an answer to industry under performance, is nothing short of naive. Solutions such as single-source selection via Design and Build procurement or project alliances and lean-based approaches, are seen as insufficient ways of delivering real change:

> These solutions are offered by governments who assume that through the first tier the numerous contractual interfaces between firms in the supply chain will be managed better and productivity of the industry will improve. The naivety of this assumption is astounding. Whether we like it or not, unless there is a raft of explicit incentives, rewards and/or punitive measures developed within the contractual relationship between the client and the contractor, it is suspected that short-term project integration, let alone any long-term industry integration, will not be achieved (London, 2008: p.44).

This criticism drives at the heart of the large client and large contractor, approaches to integration, which myopically focus on the first tier of the supply chain (OGC, 2005). London (2008) draws attention to the lack of approaches which take account of the wide range of behaviours, and organisational factors which comprise the different tiers of the supply chain. Similarly, compounding the criticism of *Rethinking Construction* (Egan, 1998), there is a lack of discussion of the nature of the research methodology or empirical evidence upon which it is based. The report is lacking in this way as it states that it draws on secondary data and has the following unclear statement:

> The Task Force's ambition for construction is informed by our experience of radical change and improvement in other industries, and by our experience of delivering improvements in quality and efficiency within our own construction programmes (Egan, 1998: p. 4).

SCM is perceived as an integrating, and value-orientated framework able to drive industry performance improvements. As such, it may provide a tangible way to increase the effectiveness of value transition points in the form of Design and Build tendering. The construction industry is made up of a multitude of different actors, taking many different forms, which comprise the construction supply chain. Clearly there is a need to provide practical guidance to a wide range of practitioners to truly galvanise the benefits from applying SCM. This point is particularly pertinent when one takes account of the need to transition client value through the different members of the construction supply chain.

Mouritsen *et al* (2003), advise practitioners to carry out a deeper enquiry into the specific environmental and power relationship factors in any particular scenario before universally championing concepts such as collaboration and integration. In doing so, they forward a cautionary approach to those seeking to transfer the best practice benefits of SCM, and extend their advice to include that it 'should only be copied if the objective situational factors are exactly the same, which is very seldom the case' (Mouritsen *et al,* 2003: p.694).

Drawing attention to the important role relationships play in SCM can be likened to the way that relationships have been considered crucial in construction for many years. The importance of relationships in the construction industry was recognised in early influential industry reports (Emerson ,1962) and is firmly established in buyer-supplier exchange (see for example, Poirier and Houser, 1993; Me Hugh *et al,* 2003; Bullington and Bullington, 2005). Studying relationships leads to consideration of specific behaviours. Blake and Mouton's Dual Concern Model (1964), which is shown below in Figure 3.4, usefully illustrates different types of exchange behaviour. However, even when both parties have a high concern for the other exchange parties' interests and their own interests, this only leads to a situation of compromise as shown in box D. With compromise, both parties are limited to winning and losing a bit.

Concern for other's interest

	Low	High
Low	A Avoidance *Both parties lose*	B Forbearance *One party loses and one party wins*
High	C Rivalry *One party wins and one party loses*	D Compromise *Both parties win 'a bit' and lose 'a bit'*

Figure 3.4: Dual Concern Model (Adapted from Blake and Mouton, 1964)

Such a pessimistic outlook for buyer-supplier exchange stands in contrast to the commonly traded benefits of SCM:

> There is scope for benefits in terms of quality, faster construction times and financial savings through contractors and their clients working more closely together in longer term relationships (partnering). Subject to appropriate safeguards, such productive relationships deserve to be promoted in public sector construction (PAC, 2001: p.1).

Such positive views, which are based on a belief that all parties can benefit from SCM, are challenged by Cox (2004a) and Cox, *et al* (2007), who believe that such win-win outcomes between buyers and suppliers in exchange transactions are not feasible, as all exchanges are ultimately contested. Framing the UK construction industry using a power and leverage perspective of relationship and performance management (Cox; 2004a, b; Cox and Ireland; 2002; Cox *et al,* 2000, 2004, 2007), they stress that ‘any attempt to search for win-win outcomes is a waste of everyone’s time and effort, whether in construction or in any other types of supply chain or market’ (Cox *et al,* 2007: p.278).

Their theoretical framework is extremely useful for those trying to convert the populist SCM adoption messages into practice, as it encompasses power and leverage from an industry, buyer and supplier perspective and takes account of their effect on appropriate relationships. However, those wishing to follow the repeated message to adopt SCM to improve construction performance, are left with a dilemma, as one of the main contentions of the body of Cox-led work, is that there is a lack of clients with the requisite standardised long-term demand to develop successful highly collaborative partnered supply chains (Cox *et al,* 2007). This belief is particularly important when one considers that the majority of construction-based SCM research and guidance is client-centric.

The calls for construction-based SCM have overwhelmingly stemmed from a client-centred approach. Such approaches place the client in the position of the protagonist for change (Bell, 1994; Latham, 1994; Egan, 1998; Strategic Forum, 2002; Briscoe *et al* 2004). Briscoe *et al* (2004) found that when it comes to integrating the supply chain, clients are the most significant factor, and without the client’s desire to develop supply chain relationships, integration could not be achieved.

The propensity to forward a client-centric approach to SCM sits awkwardly with the belief that there is a paucity of clients able to propagate a suitable power and leverage environment. Similarly, it leaves the majority of the industry, in the form of main contractors, subcontractors, consultants, specialists, suppliers and manufacturers who actually work in the industry, with little guidance in developing their own approach to SCM.

3.3.7.7 *Organisational and Project Supply Chains*

Referring to Male and Mitrovic's (2005) distinction between the Project Supply Chain (PSC), and the Organisational Supply Chain (OSC), provides us with a starting point to navigate a route through such client-centric approaches. Their distinction is developed from Male's (2092) airport and airline analogy, which conceptualised the main contractor as a supply chain network 'hub', responding to a variety of client needs by managing a number of project-specific supply chains. Male and Mitrovic (2005) open the door for contractor-centric supply chain management, as they highlight the way in which the OSC is the main contractor's organisational supply chain, whilst the PSC is focused on a specific client requirement. As the OSC frames the approach to SCM around the contractor's organisation, it shows how the contracting organisation can form their own approach to SCM to impact on a multitude of specific projects in the form of the PSC. In addition, the contractor, as the SCM protagonist, can forge an approach which does not require a client sponsor with the requisite demand profile or propensity to act as supply chain protagonist. Moreover, as the main contractor's core business is construction, their approach to SCM has the potential to more closely meet the needs of the wider industry.

Building on the OSC and PSC distinction in this way, can be contrasted with the relatively myopic client-centric SCM guidance. The OSC acknowledges that main contractors, with adequate organisational and economic size, who are able to seize their position as hub of a number of supply chain networks, can develop their own approach to SCM and provide the benefits to a raft of different clients. Whilst recognising that clients such as the Ministry of Defence and British Airport Authority have developed their own managed supply chains, there are a limited number of clients with the necessary repeat demand to sustain their own approaches to SCM (Cox *et al,* 2007). The main contractor is well placed, as the conduit between client and the rest of the supply chain, to form relationships with the supply chain. Nevertheless, the main contractor's advantageous position as a demand channel sitting between the client and the rest of the supply chain (as shown below in figure 3.5) is not widely recognised.

Multitude of clients

Main contractor

Contractor Centric Supply Chain Management

Multitude of subcontractors

Figure 3.5Contractor-centricSupply Chain Management

The main contractor's relationship with their subcontractors are arguably their most important downstream supply chain relationships. By focusing in on these relationships, it is easy to see how the lack of contractor-centric discourse fails to address the damage that opportunism can lead to in these relationships:

> Opportunism is a rational response for those involved in one-off games, in which there are no incentives for higher rewards from not maximising returns in the short-term. Obviously, collaboration is a better alternative if there are incentives that allow parties to the exchange to envisage higher returns rewards in the future. In such circumstances maximising short-term advantage is not a logical response to the superior commercial opportunities that may be feasible in the future from entering into bilateral dependency operationally (Cox *et al,* 2007: p.31).

Although Cox *et al* (2007) are clear that, in situations where higher future rewards are envisaged, collaboration is the more logical response, they do not point out that contractors and their supply chains are able to benefit from collaborative approaches. Indeed, in stressing how most UK clients lack the standardised long-term demand to benefit from long-term collaborative approaches, their work mirrors the majority of construction-based SCM guidance, as it fails to address the important role contractors can play in developing SCM. The major exception to the well trodden client-centric path is the Ministry of Defence's *Building Down Barriers* approach, which adopted a contractor-centric approach to SCM (Holti *et al,* 2000; Nicolini *et al,* 2001). Unfortunately, whilst incorporating many ambitious and arguably effective components such as ring-fenced profit and cost, the approach suffered from a lack of adoption.

3.3.1.2 Contractor and Subcontractor Relationships

The important role procurement plays in realising the client's value system, has been made clear in previous sections of this thesis. Taking account of the wide and far ranging nature of the construction supply chain, and the important role main contractors and their subcontractors play in Design and Build procurement, leads us to consider how contractors can develop an approach to SCM which focuses on their relationships and transactions with subcontractors at tender stage. The problematic nature of many relationships in the construction industry is something that has a long and well documented history. Banwell (1964) advised that specialist contractors needed to develop close relationships with other parties involved in the project, and that this could be facilitated by their early involvement in the project process.

Existing research similarly highlights the difficult and complex nature of contractor-subcontractor relationships. Ireland (2004) shows how difficult the situation is by drawing attention to the way in which contractors need to strive for continuity of work in an industry characterised by low barriers to entry; a factor which limits profit levels and leads to a lack of integration resulting in opportunism and adversarial practice. Add to this the need to provide an environment conducive to SCM, which will enable more effective relationships to be cultivated with subcontractors, and the size of the task becomes clear.

Dainty *et al* (2001) carried out research involving a number of large contractors and their small and medium sized subcontractors. Using semi-structured interviews analysed using Computer Aided Qualitative Data Analysis Software

(CAQDAS), they explored subcontractors' perspectives of supply chain alliances and found that:

> ....there remains a general mistrust within the SME (small to medium-size enterprises) companies that make up the construction supply chain, and a general lack of belief that there are mutual benefits in supply chain integration practices (Dainty *et al,* 2001: p.847).

Despite lacking a detailed description of how the resulting issues emerged, the work highlights the lack of appreciation for SCM beyond the confines of the large-client tier one level of the supply chain. Similar attitudinal barriers restricting the ability to collaborate between subcontractors and main contractors were found by Briscoe *et al* (2001).

This tour of SCM literature has demonstrated how important relationships are in developing effective SCM. When we look in more detail at construction SCM, and more specifically main contractor-subcontractor SCM, it is clear to see the problematic nature of relationships at this level. There exists the need for detailed guidance for main contractors seeking to develop their own approach to SCM in order to increase the effectiveness of Design and Build tendering. Developing construction-specific SCM will avoid the problems of seeking to implement models from industries where SCM is established; doing so without recognising the importance of context, has been found to lead to difficulties (Fisher and Morledge, 2002). By comparing construction with the aerospace industry, Green *et al* (2005), found it imperative that practitioners seeking to implement SCM models, recognise the importance of organisational and sector-specific context. Irrespective of the intention to utilise a model structured around the requirements of another industry or organisation, there is a lack of practical advice grounded in the reality of the industry to draw on for those seeking to develop SCM in order to improve Design and Build tendering.

3.4 Summary

This chapter has explored the following three main themes:

- The development of tendering processes by making reference to the major Government sponsored reports and other key works which have impacted on tendering in the UK construction industry over the last 60 years.
- The different tendering mechanisms, such as open and selective tendering, used in UK construction. This culminated in a focus on tendering mechanisms used specifically on Design and Build projects.
- Supply Chain Management, which has been increasingly proposed as a way to increase the performance of the UK construction industry by helping to reintegrate what is commonly regarded as one of the industries biggest problems; fragmentation.

Considering the development of tendering practice over the last 60 years showed how much high-level consideration has been given to this major value transition point. Selective tendering was introduced to avoid the problems associated with open tendering; quality issues, post-contract cost increase and the inefficient use of contractor's resources which places upwards pressure on prices. Selective tendering brought with it a greater focus on quality, owing to the way that the prequalification process component of selective tendering assesses potential contractors on the basis of various quality criteria before allowing them to tender.

The focus on quality developed into a more widespread message to select contractors on the basis of overall value for money, rather than simply considering the lowest capital cost tender. Such an approach incorporates selecting contractors on their ability to add value, yet hinges on the client being able to articulate what value means to them; a theme explored in greater detail in chapter two.

At the same time, the major Government-sponsored reports were keen to advocate the benefits available to those clients who choose to develop an early team approach which centrally involved the contractor in the development of the project. Two-stage selective tendering can be used to allow clients to select contractors early, as it allows an early element of competition, which then leads to one contractor developing the scheme in detail with the client. Design and Build procurement, the focus of this thesis, is presented as being substantially different and more complex than tendering on Traditional contracts. This is undoubtedly the case where the client must decide between the way different contractors interpret their needs, for example, in a design competition.

The problem stems from the requirement to decide between ‘apples and pears’, as the competing contractors’ schemes will differ. Unfortunately, the literature is less useful in articulating approaches to deal with such a situation. In addition, the way that Design and Build tendering is described as being substantially different to tendering on Traditional Contracts, fails to take account of the wide variety of procurement routes which fall within the Design and Build family. Where more developed forms of Design and Build are used, and the scheme is substantially developed prior to contractor involvement, contractors' price the same tender documents leading to a relatively straightforward price and qualification tender evaluation. Once more, and taking account of the way that Design and Build is advocated as a procurement route which integrates the different project value transition points to ensure the client's value system is effectively realised, there is a lack of tendering development to ensure this type of Design and Build can select contractors on their ability to add value.

SCM is increasingly being forwarded as a way to improve the performance of what is commonly regarded as an underperforming UK construction industry. The way it is focused around value generation, rather than simple cost reduction, and its ability to integrate the project process, potentially offers much to the client keen to realise value through their construction project. The integrative potential of SCM may help effectively transfer client value through the important client-main contractor and main contractor-subcontractor tender processes. This would, in turn, bring about an overall increase in the effectiveness of Design and Build tendering.

SCM development in the UK construction industry has become polarised around large clients with standardised long-term demand profiles as evidenced by this literature review. Such a specialised client-centric approach leaves the majority of the industry unable to harness the benefits of SCM. Whilst the literature is clear on how few clients have the requisite demand profiles to act as successful SCM protagonists, it is less forthcoming in alternative ways to propagate successful SCM. Nevertheless, contractors, as the organisation located at the head of the demand channels for numerous projects, are well placed to develop their own organisational supply chains able to pass the benefits of SCM to multiple parties including their clients. Further, and directly related to value transition through the many tender transition points on each project, contractors carry out multiple contractor-subcontractor tender processes for every single client-main contractor tender process. Whilst the literature focuses on first tier client-main contractor tendering, it almost entirely fails to explore contractor-centric SCM and how this can impact on second tier tendering such as the crucial contractor-subcontractor tender point.

These issues are explored in following chapters through the collection of empirical evidence, and this requires a research methodology which is fit for purpose. The next chapter explains how the research methodology was developed to deal with this specific research problem, which aims to provide practitioner guidance to enhance the effectiveness of Design and Build tendering.

Chapter 4: Research Design

This chapter explores the research design which was developed in order to meet the research task. It demonstrates how the design provides ‘fitness for purpose’. The chapter is structured into four sections, as shown in the table below:

4.1 Theoretical Perspective

Theoretical perspective: the philosophical stance informing the methodology and thus providing a context for the process and grounding its logic and criteria (Crotty, 1998: p.3).

This research is located in the field of construction management, which does not benefit from a unifying theory. Whilst the work does incorporate a focus on value, which is encompassed within the theory of axiology, and the Supply Chain Management (SCM) which it incorporates borrows aspects of disparate theory from the field of business management and economics, none of these theories can be considered an overriding theoretical framework offering the necessary depth or focus in which to locate this research. The immaturity of theory development in the discipline of construction management has been previously reported by Betts and Lansley, who commented that 'the discipline is becoming rather inward-looking, self referential and lacking in its guidance from and contribution to theory' (1993: p.22).

4.1.1 Modified Grounded Theory

An inductive approach to developing new theory has been chosen to provide the necessary theoretical perspective and demonstrate the fitness for purpose of the research. Patton (1990) defined inductive analysis as follows, stressing the immersive and openly questioning nature of this approach:

> Immersion in the details and specifics of the data to discover important categories, dimensions, and interrelationships; begin by exploring genuinely open questions rather than testing theoretically derived (deductive) hypotheses (Patton, 1990: p.40).

Taking account of the need to explore, rather than test, and the importance of discovering categories, dimensions and relationships, this research adopts a modified form of Grounded theory (GT). The modified GT allows new issues to emerge from the data, through a systematic approach, as shown below:

> Essentially, grounded theory methods consist of systematic inductive guidelines for collecting and analyzing data to build middle-range theoretical frameworks that explain the collected data. Throughout the research process, grounded theorists develop analytic interpretations of their data to focus further data collection, which they use in turn to inform and refine their developing theoretical analyses (Charmaz, 2000: p. 509).

GT itself emerged in what Denzin and Lincoln (2003) have called the golden age of modernism, which is defined by an increasingly rigorous approach to qualitative analysis. The clear and considerable gaps in the literature identified in this research, for example the lack of exploration of main contractor-subcontractor tendering, and contractor-centric SCM, underline the importance of allowing new issues to emerge and be recognised in the findings. The overall intention behind adopting such an approach, which incorporates a mixture of qualitative and quantitative approaches (as explored in later sections of this chapter), is that it will allow a new formal theory to emerge which is firmly bonded to the data (Glaser & Strauss, 1967). The use of GT in construction management research follows a well-trodden path as evidenced by it being used in numerous studies (Skitmore, 1999; Dainty *et al,* 2000; Hunter *et al,* 2005).

The approach is termed 'modified' GT as it does not follow the purely inductive approach, as originally envisaged by Glaser and Strauss in their seminal work, *Discovery,* which introduced the research community to GT in 1967. Instead, the modified approach is more in tune with that of Strauss and Corbin's (1998) approach to GT which accepts that a prior knowledge exists, thereby dispelling the belief that the world can be viewed as a vacuum where existing knowledge is not taken into account. In terms of the practicalities of this thesis, the use of modified GT means that my own knowledge of the industry, allied with a review of literature, and early focus group interviews, helped to locate the gaps in current knowledge which formed the starting point of the study. This type of inductive-deductive approach, which relies on the interplay between data, literature and analysis, ensures emerging themes are developed from, and grounded in, the practicalities of the industry, whilst also being located in the literature.

Diverging from the purely inductive approach taken in *Discovery* should not be viewed as bravely breaking the research mould, as much of the research community has converged around a preference for pragmatic theory development which takes account of existing literature and prior knowledge of the area of interest (Miles and Huberman, 1994; Strauss and Corbin, 1998). Taking this approach enabled guiding aims and objectives to be developed which were revisited and refined throughout the period of study. Interestingly, Glaser and Strauss, the original co-authors of *Discovery* and developers of GT, have developed their thinking (prior to Strauss's death in 1996) in different ways. Glaser has taken more of an inductive approach (for example, see Glaser, 1992) whilst Strauss, working with Corbin, became more pragmatic in recognising apriori knowledge (see Strauss and Corbin, 1990; Strauss and Corbin, 1998).

Charmaz (2000), has considered the philosophical implications of the major works in GT. For her, Discovery (1967) was imbued with positivism and objectivism, whilst Glaser later strayed very closely to a traditional positivism, where reality is ready to be captured and logged (Glaser, 1992). Strauss' later work with Juliet Corbin (1990; 1998) is more aligned with post-positivism, where voice is given to the participants in an attempt to accurately represent their lives, and this research follows the tradition.

Discovery (1967), has been criticised for its abstract nature, which made it difficult for researchers new to GT to practically apply (Charmaz, 2000). Strauss and Corbin's (1990) later work made GT much more accessible for new researchers, although for Glaser (1992), it was too prescriptive and led to new theory being forced to emerge. Taking the approach that existing knowledge should be recognised, as with Strauss and Corbin (1998), can be related to the way a gap was identified in existing knowledge which led to the initial identification of the area to be studied in this research.

The boundaries of the sample frame used in GT research are defined by use of what is termed 'theoretical sampling', which is based on the following guiding principles:

1. Purposeful Selection - Participants, and other units of enquiry, are selected based on the emerging issues; they are not predetermined, and instead are chosen purposefully based on their ability to add to the study. As Charmaz puts it, 'We use theoretical sampling to develop our emerging categories and to make them more definitive and useful. Thus the aim of this sampling is to refine *ideas,* not to increase the size of the original sample' (2000: p.519). Charmaz is keen to point out that the aim is not to increase the sample size and this advice which fits with her belief in the benefits of purposefully selecting participants later in the study to avoid the analytic directions, and associated data, being forced

(2000). This study utilised theoretical sampling throughout, by relying on the interplay between literature, data and the guiding aims and objectives, to inform sample selection. As such, it is more in tune with Strauss and Corbin (1990) and it was not felt that this decision led to early analytic closedown; rather the decision led to an inherent flexibility.

2. Theoretical Saturation - Purposeful sampling continues until the research has reached a point where theoretical saturation has occurred; a point is reached where new data simply confirms what is known already and can add nothing more to the analysis. However, the belief that research can reach a 'theoretically saturated' point has been questioned. For example, Knight (2004), points out that few GT studies discuss their own theoretical saturation in any depth, and instead believes sample size is determined by pragmatic issues such as economic constraints or the sample size in similar studies. On this point, experience of previously using GT led me to take a similar view to Knight (2004), and dismiss attempting to reach a point of saturation. The long-term nature of the study attests to the time, and depth of enquiry, which was sufficient for saturation to occur, but ultimately sampling was brought to an end owing to the timeframe allowed to complete the work. Specific sampling issues, such as sample size, are discussed in the respective methods sections later in this thesis.

In order to provide academic rigour and ensure the findings demonstrated the necessary trustworthiness, a peer review process was carried out to review the findings of the study. The methods of analysis are a central component of GT research, and this aspect of the study is covered in further detail in the analysis section of this thesis.

4.2 Methodology

Methodology: the strategy, plan of action, process or design lying behind the choice and use of particular methods and linking the choice and use of methods to the desired outcomes (Crotty, 1998: p.3).

The methodology, as an overarching approach to the study, informs which methods are used in the research. The need to ensure the research methodology underpinning this research provided fitness for purpose, was the key overriding selection criteria. The research methodology employs a mixed-method approach, which utilises both qualitative and quantitative approaches. Epstein *et al* (1991) offer a good distinction between qualitative and quantitative approaches, by showing how qualitative methods allow understanding to be developed using richly textured data, whilst quantitative methods enable a large number of contextual variables to be incorporated in the work. Dainty (2008) is keen to forward a case for construction management research adopting more mixed-methods approaches, termed ‘methodological pluralism’, as shown below:

...the benefits of holism - combining methodological perspectives in order to gain richer insights and a more complete understanding of social phenomena - are particularly persuasive in the context of doing research in the construction sector. A more expansive outlook towards mixing methodologies and research paradigms could yield deeper insights into, and understanding of, the way that practitioners ‘do’ management in the construction sector (Dainty, 2008: p.11).

Despite qualitative and quantitative approaches being seen by many as mutually exclusive research strategies, something which Crotty (1998), has recognised and called ‘the great divide’, support for mixed-methods approaches to research, which mix qualitative and quantitative, is growing (Morgan, 2007; Creswell and Plano Clark, 2007). Greene *et al* (1989), believe there are five reasons why mixed-method approaches should be adopted: triangulation, initiation complementarity, development, and expansion. In this research, triangulation is the primary reason for adopting a mixed method approach. Triangulation is an epistemological claim concerning what more can be known about a phenomenon when the findings from data generated by two or more methods are brought together (Moran-Ellis et al, 2006).

As part of the mixed-method approach, this research employs a two-part survey and case study methodological approach. The next section explores these two approaches in greater detail.

4.2.1 Survey

The survey approach is a research *strategy,* not a method. Researchers who adopt the strategy are able to use a whole range of methods within the strategy: questionnaires, interviews, documents and observation. What is distinctive about the survey approach is its combination of a commitment to a breadth of study, a focus on the snapshot at a given point in time and a dependence on empirical data (Denscombe, 2007: p.8).

As highlighted, a survey is a research strategy employing various methods in order to collect empirical data relating to a particular area of interest. Of paramount importance to this research are the different strengths and weaknesses of surveys and case studies; this study adopts both approaches in order to provide a suitably comprehensive overall methodological approach. As Mason (1996) so clearly articulates, the ability to generalise the results outside the confines of the study is an important consideration for qualitative researchers:

> I do not think qualitative researchers should be satisfied with producing explanations which are idiosyncratic or particular to the limited empirical parameters of their study...Qualitative research should produce explanations which are *generalizable* in some way, or which have a wider resonance (Mason, 1996: p.6).

Whilst case studies offer the benefits of depth and focus, surveys offer the ability to generalise the results more widely, underlining the benefit of the two-pronged methodological approach adopted as part of this research. Surveys can incorporate a wide range of methods, and this research utilises semi-structured interviews, and a postal questionnaire, which are expanded on in later sections of this chapter.

4.2.2 Case Study

> The starting point and arguably the defining characteristic of the case study approach is its *focus on just one instance of the thing that is to be investigated...The* logic behind concentrating efforts on one case rather than many is that there may be insights to be gained from looking at the individual case that can have wider implications and, importantly, that would not have come to light through the use of a research strategy that tried to cover a large number of instances - a survey approach. The aim is to illuminate the general by looking at the particular (Denscombe, 2007: p.35-36).

This study adopts a case study approach as it allows complex issues to be contextualised and understood in depth from the viewpoint of a range of individuals from different professions, organisations, sectors and sides of the buyer-seller divide in construction. The suitability of a case study approach for this research, which requires such depth of analysis on issues that have previously been unexplored by the construction management research community, is underlined by considering Patton's comments when contrasting the case study approach with random probabilistic sampling:

> Case studies, on the other hand, become particularly useful where one needs to understand some special people, particular problem, or unique situation in great depth, and where one can identify cases rich in information - rich in the sense that a great deal can be learned from a few exemplars of the phenomenon in question (Patton, 1990: p.54).

However, whilst case studies are clearly suited to research in the field of construction management, Proverbs and Gameson (2008) believe that they aren't very popular in the field as there is a lack of construction-specific guidance. Nevertheless, Proverbs and Gameson are clear on the scope for applying case study-based research in the field:

> ....there remains considerable scope for further application of the case study technique in studying, capturing and disseminating the innovations and novel solutions adopted on construction projects and/or within construction organisations (Proverbs and Gameson, 2008: p. 109).

Yin, perhaps most widely recognised as the most influential writer on case study research, is keen to point out the contextual and holistic advantages of the case study approach: The case study allows an investigation to retain the holistic and meaningful characteristics of real-life events (Yin, 1994: p.37). Similarly, the holistic, or all-embracing, nature of case studies are seen as their defining feature by Feagin e/a/(1991).

Yin's work has led the way to increasing the reliability and validity of case studies, for example, by using multiple sources of information and developing a case study database (1994). This research employs these best practice principles, which are expanded on further in the methods and analysis sections of this chapter. The case study approach used in this research utilises various methods of enquiry including interviews, documentary analysis and statistical analysis of company data. Details of the case are explored in greater detail in chapter six in order to provide the necessary contextualisation.

4.3 Methods

4.3.1 Postal Questionnaire

The questionnaire was carried out at a relatively early stage in the thesis and mainly focuses on the client-main contractor tender process. It was developed based on the issues which emerged from the literature, focus group and semi-structured interviews. The questions were reviewed by participants who had previously been involved in the research to gain an element of peer review (all three questionnaires are included in the appendix to this thesis). The link between the resulting questionnaire and the findings emerging from the literature and the interviews, is underlined by considering an example taken from the work. A finding which emerged early on in the study is the popularity of developed forms of Design and Build (explored in greater depth in chapter five of this thesis).

Whilst some literature (Akintoye, 1994; Bennett *et al,* 1996) recognises that different forms of Design and Build exist, including those differentiated by the amount of pre-contractor design and specification development, Design and Build is still widely portrayed as a form of procurement where the contractor is responsible for developing the design and specification from an early stage (CIOB, 1988; OGC, 2007). In addition, literature in the field remains silent on the popularity of the different forms of Design and Build, and does not clearly articulate the reasons why clients are choosing to use Design and Build.

Clearly, this was an area which needed exploring in greater depth, and the interview process enabled various properties to emerge. Following this, the questionnaire was used to gain an understanding of how commonplace these issues are, such that the results can be generalised to a larger population. These two issues are dealt with in two separate questions which are structured around the findings generated from the literature review and interviews. In the contractor questionnaire, question four asks the following:

Q4 Which five of the following are the most important reasons you think clients use D&B?
Please use the appropriate letter to indicate your choices, where 1 is the most important

			Reasons:
A Risk transfer	**B** Reduced Cost	**C** Convenient	1
D Single Point responsibility	**E** Innovation	**F** Short overall time	2
G Reduced design cost	**H** Certainty of final cost	**I** Buildability	3
J Simplified decision making	**K** Short pre-construction time	**L** Lower Consultant costs	4
			5

The 12 reasons why clients use Design and Build, which are incorporated in the question, came from the literature, interviews and the initial focus group.

Respondents were asked to rank them in order of importance to gain an understanding of their relative popularity. The second issue highlighted above- the type and popularity of Design and Build in use today-is similarly operationalised in question eight in the questionnaire as follows:

Q8 Which **one** of the following D&B variants do you prefer **and** which **one** have you used the most often over the last year?

	Prefer	Most Used
1. Virtually no design prior to tender and the design is worked out between you, the client and his consultants		
2. Outline drawings and mixture of performance and prescriptive specification prior to tender		
3. Very detailed drawings, very firm specification prior to tender		

As can be seen, the three different categories, which have been articulated in the question, correspond with different degrees of pre-contractor design and specification development. This question allowed both preference, and frequency of use, descriptive statistics to be collected.

Reliability and validity are important considerations in questionnaire design. Reliability is a measure of the ability to yield the same results when repeated over time with different participants, or as Hammersley (1992) eloquently puts it, reliability:

> Refers to the degree of consistency with which instances are assigned the same category by different observers or by the same observer on different occasions (1992: p. 67).

Denzin and Lincoln (1994), when discussing validity, draw a useful distinction between internal validity, which refers to the way the findings relate to issues being studied, and external validity, which is determined by the ability to generalize the findings outside the study. Validity is less of a concern in this work as the questionnaire incorporates factual statements which are relatively straightforward in nature.

The research utilises stratified random sampling which has been defined as:

> ...one in which every member of the population has an equal chance of being selected *in relation to their proportion within the total population* penscombe, 2007: p. 14).

This means that random sampling, where selection is made randomly from a large enough population in order to ensure the sample is a representative cross-section of the population, takes place within boundaries, or strata, defined by the researcher. In this instance, the following three groups of clients, consultants and main contractors, represent the different strata from which the random sample is taken:

1. Contractors.
2. Clients.

3. Consultants - including architects, services engineers, structural engineers and quantity surveyors.

It should be noted that the population of main contractors, clients and consultants, is extremely difficult to both define and identify. Consider the population of clients: whilst some will fall into the category of long-term regular repeat demand procurers of construction services, others will use construction services rarely (see chapter two of this thesis for a fuller discussion of this point). Owing to these difficulties, a pragmatic approach was taken and the sample was taken from the emap Glenigan national construction database. The UK wide database incorporates details of parties submitting construction planning applications. Three different questionnaire templates were developed specifically for the following groups. Each strata has a sub-sample size of 220 organisations, providing an overall sample of 660 organisations.

The sampling recognised a range of construction organisations differentiated in terms of their specialism, location, and size, in order to gain an element of generalisability in the results. A response rate of approximately 20% was achieved, which was proportioned equally across the three sub-samples. This response rate falls short of the 30% rate which is believed to be the average by Hoxley (2008). Analysis of the questionnaires is explored in a later section of this chapter.

4.3.2 Interviews

In the context of social science research, what exactly do we mean by interviewing? Fontana and Frey provide a useful definition:

> Interviewing is one of the most common and powerful ways in which we try to understand our fellow human beings. Interviewing includes a wide variety of forms and a multiplicity of uses. The most common form of interviewing involves individual, face-to-face verbal interchange...It can be structured, semistructured, or unstructured...It can be used for the purpose of measurement or its scope can be the understanding of an individual or a group perspective (Fontana and Frey, 2000: p.645).

As can be seen, interviews encompass a large range of different variations in the way they enable us to develop understanding and their pervasiveness in everyday life has led to today's society being termed the 'interview society' (Atkinson and Silverman, 1997). The popularity of interviewing is underlined when one considers that Briggs (1996) estimates that in social scientific research studies, they are used in 90 percent of instances. Dainty's (2007) review of construction management research found that studies, which solely utilised qualitative methods, all used semi-structured interviews. Whilst the findings were limited, as they were based on the review of papers published in volume 24 of the journal *Construction Management and Economics,* they do point to the popularity of these types of interviews. However, for Hammersley and Gomm (2005), the popularity of interviews has led to an over-reliance on them. Taking account of this usefully cautionary advice, the mixed-method approach adopted in this study avoids this danger.

This research employs a mixture of group and individual face-to-face interviews with a range of practitioners from the following groups:

1. Clients.
2. Consultants.
3. Contractors.
4. Subcontractors.

It should be noted that the consultant strata consisted of project managers, quantity surveyors and architects. A range of practitioners, from different functions and hierarchical levels within their respective organisational groups, were identified through theoretical sampling (participants are chosen based on their ability to add to the research in a purposeful manner) and interviewed. As such, there is no pre-defined sample size. Glaser and Strauss (1967), believed theoretical sampling to be complete when all new data confirms the findings and does not offer any new avenues of enquiry; termed 'theoretical saturation'. However, this research adopted a more pragmatic view, which blended this type of closure with everyday practicalities such as the timeframe which the PhD process allows.

The research began with a focus group expert interview involving two project sponsors who could be considered 'experts' in the field of enquiry. Through theoretical sampling, the interview sample size expanded throughout the research programme until 65 participants had been formally interviewed. The interviews ranged from approximately one hour in length, to over two and a half hours, and a number of participants were interviewed more than once as part of the peer review process. All interviews were fully transcribed and analysis techniques are explored in a later section of this chapter.

From the main contracting group the following individuals were interviewed:

- Directors - various, including preconstruction, commercial, operational, regional and main board.
- Commercial Managers.
- Contract Managers.
- Project Managers.
- Quantity Surveyors.
- Design and Build Managers.
- Estimating staff.
- Business Development staff.
- Procurement staff.

In addition to the range of participants interviewed, from each of the groups above, a number of 'expert' interviews were carried out with individuals deemed to be able to contribute expert knowledge to the study. The degree to which interviews are structured is an important consideration in research design and ranges from structured, through to semi-structured and onto unstructured. The semi-structured interview is central to grounded theory, with the interviewer typically using an interview guide to allow direction of the interview in order to cover certain points of interest, whilst simultaneously allowing new issues to arise. As such, semi-structured interviews were adopted for this research and utilised an interview guide (an example is included in the appendix to this thesis).

4.3.3 Expert Focus Group

An expert focus group was formed as part of the case study in order to develop the findings from the study on an ongoing basis. The focus group included staff from the main contracting organisation at the core of the case study, and was formed to incorporate individuals representing the whole geographical spread of the business, as well as various disciplines. The group convened at regular intervals to consider SCM and Design and Build tendering. Various sub-groups were also formed to focus on specific issues. The group's meetings were recorded on flipcharts and the key issues were coded and incorporated in the analysis along with other types of data. The constant refinement and peer review by the national working party and subcontractors involved in the nationwide seminars helped ensure rigour and transferability.

4.3.4 Listening Days

Two 'listening days' were held with clients and subcontractors in order to enable issues to emerge in a group environment, and provide an opportunity to gain feedback on the developing analysis. On the first day, four individuals representing subcontractors attended, and on the second day, two individuals representing client organisations attended. The days were facilitated by the expert focus group and the followed the format of asking what issues were important to the different groups, and allowing issues to emerge. The findings were recorded on flipcharts and the key issues were coded and incorporated in the analysis, along with other types of data.

4.3.5 Company Data

As part of the case study approach, subcontractor order data from the main contracting organisation at the core of case study was analysed using descriptive statistics. The sample included all orders placed on the organisation's subcontract order database. The power of the analysis is dependant on the accuracy of the data set and in this instance, it was based on the details that are entered when an order is created. This is an especially important consideration, as incorrect initial categorisation affects the results of the analysis. For example, if structural steelwork is assigned to the metal fabrication category, it would be allocated an incorrect trade category in this analysis.

Trade codes which were assigned to the order were used to categorise data. The data was cleaned to remove outliers. However, owing to the size of the data set, with almost 13,000 committed orders by December 2005 (the data at which access to the data set was terminated), it was not possible to check all individual orders. Nevertheless, the random line-by-line checks indicated that the data was extremely accurate.

4.3.6 Literature Review

Literature is considered an essential part of Strauss and Corbin's (1990) approach to GT. They articulate five key purposes for its use:

1. To stimulate theoretical sensitivity.
2. Provide secondary sources of data.
3. Encourage questions to emerge during data collection and analysis.
4. Direct theoretical sampling.
5. Used as supplementary validation.

Earlier sections of this chapter sensitised the reader to aspects of debate within the field of GT surrounding the use of literature. Whilst some believe GT should not take account of existing literature (Glaser, 1992), this research adopted a modified approach to GT which takes advantage of existing literature.

The literature review used government reports, journal articles, textbooks and postgraduate degree theses. The approach to collecting literature was systematic and involved a rigorous approach to interrogating databases (UK and international literature was utilised in the study), storing the results, and regularly updating the review material. Similarly, the review process was structured by using a literature review guide developed to focus critical enquiry under various headings including key arguments, methodology and strengths and weaknesses. A copy of the literature review proforma, used in this research, is included in the appendix.

4.3.7 Gaining Access

It is believed that gaining access to participants was made easier, as the research was viewed by many participants to be of value to their organisations. Similarly, participants saw a value in becoming involved in PhD-level work, which they clearly viewed as being of greater importance than the undergraduate dissertations which many of them chose not to become involved in. However, perhaps of all the factors which encouraged involvement, three factors stood out as being particularly significant by the participants:

1. Perceived Status: The funded nature of the project. The fact that the early part of the work was funded under the Engineering and Physical Sciences Research Council Fast-Track Grant Programme (Knight *et al,* 2002), clearly increased participants' propensity to become involved. Many of the participants stated that they were proud to be involved in a project which was deemed significant enough to have attracted government funding. Interestingly, individuals' propensity to become involved did not decrease following the conclusion of the funded part of the project.

2. Perceived Status: Significance of the Award and Outputs. Participants viewed the number, and type, of outputs produced by the work particularly positively. Whilst this factor had a lag period until the various outputs started to be produced (for example Knight *et al,* 2001; Knight *et al,* 2003) and until the Chartered Institute of Building (CIOB) research award was secured (Griffith *et al,* 2004), it was clearly deemed a

significant factor and attracted their involvement. Of all the outputs, participants were most likely to offer their involvement when they were aware that early parts of the research had led to a book being published (Griffith *et al,* 2003).

3. The sanctioned case study approach - The case study approach was sanctioned at the highest level of the core case study organisation (the main contracting organisation), and as such, this increased participants' involvement at all levels, both inside and outside the main contracting organisation. For example, subcontractors were an essential part of the case study, and they were keen to offer their support as it was sanctioned by their client; the main contracting organisation.

Conducting a successful interview requires more than simply gaining access to participants and ensuring they attend interview sessions. Ensuring participants become involved in the interview process and disclose information about the subject, is arguably a more difficult proposition. Kvale (1996) draws attention to how participants often use stories to self-disclose in unstructured and semi-structured interviews, and this was also found to be the case in this research. Using researcher-led self-disclosure to encourage participants to do likewise and talk candidly (Reinharz and Chase, 2003), in order to balance the symmetry of power (Kvale, 1996), were successfully adopted in the interview process in this study.

4.4 Analysis

4.4.1 Postal Questionnaire

The questionnaire was developed using Teleform (v7.0) software package and the summary statistics were processed using the Statistical Package for Social Sciences (SPSS) software package (version 10). Various data cleaning exercises were carried out prior to analysis, including removing outliers (such as a response indicating £1 billion where this was not feasibly a correct response).

Various issues must be taken into account in order to carry out successful correlational work. In this study, the distribution of the data meant that some of the expected frequencies in the Chi-squared cross-tabulation (bivariate association between various nominal variables), were less than five, and this made the analysis unstable and violated the assumptions of the test. As such, the cross-tabulated analysis did not proceed and the analysis was limited to the use of descriptive statistics such as mean, median mode averages and frequency distributions.

4.4.2 Interviews

The interview analysis process effectively consists of fracturing data, via the assignment of code words or tags, followed by analytically reassembling the data in such a way that prominent themes, properties and dimensions are accounted for. The stages of analysis were guided by the use of open, axial and selective coding which are an intrinsic part of GT (Strauss and Corbin, 1998).

Open coding essentially describes the fracture of data into its constituent parts. Axial coding seeks to begin the reassembly of this data under more abstract categories. Selective Coding is the highest level of abstraction, where connections are established between categories to build a theory allowing variance and comparison with other substantive areas; formal theory building. It should be noted that this process is non-linear as all coding levels are carried out contemporaneously and are not intended to be disaggregated at any point; either during the analysis or in the finished thesis where they are presented as significant themes. Examples of significant themes related to the main contractor-subcontractor tender process, which emerged in the data, and are included in chapter six of this thesis, are shown below in figure 4.1:

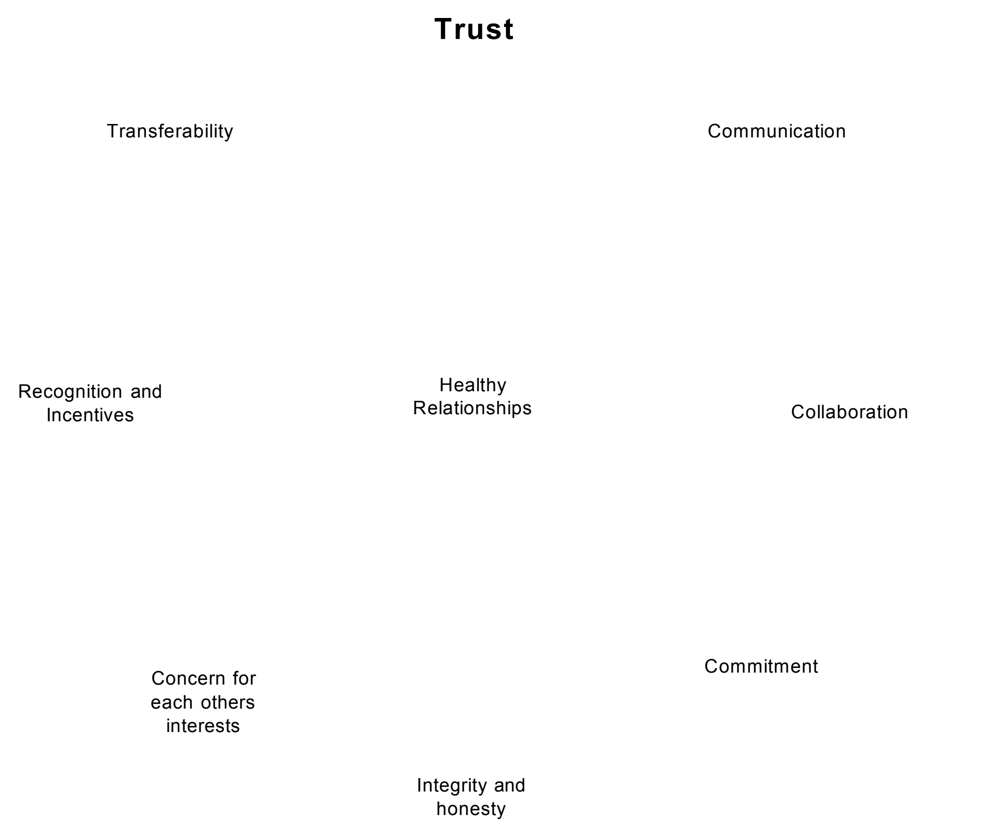

Figure 4.1 Significant Emergent Main contractor-Subcontractor Tendering Themes

The difference between grounded theory, and other common qualitative methodologies, is that the analytical tools used are described in detail. However, this does not preclude flexibility in their application. The scientific, some would say prescriptive, tools that the methodology displays, are a direct link to its developmental context; that of the golden age of modernism (Denzin and Lincoln, 2003). The manuscripts were initially coded using a paper and pencil, before these open codes were analysed and developed electronically. This constitutes the beginning of the storage and arrangement of the data, and this process is aided by the writing of memos, the research diary being constantly updated, and regular supervision sessions with the supervisory team. The use of Computer Aided Qualitative Data Analysis Software (CAQDAS) helped develop the complex multi-faceted understandings, generated in the case study, to be systematically developed.

The analysis of qualitative research has changed considerably over the last 20 years, owing to the increasing pervasiveness of Computer Assisted Qualitative Data Analysis Software (CAQDAS) (Richards, 2005). The security, pace and analytic features this software offers are very different than the manual techniques such as highlighted hard copy coding, copied extract theme building and manual frequency counts, which have been a staple of qualitative research for so many years. For this reason, this research has adopted CAQDAS in the form of Non Numerical Unstructured Data Indexing Searching and Theorizing (NUD*IST) software (Version 5). However, care has been taken to avoid viewing CAQDAS as a shortcut to producing rigorous and systematic research

(Lee & Fielding 1996, Weitzman 2000, Blismas and Dainty 2003). Three main issues, explored below, have been found to impact on the quality of qualitative research which utilises CAQDAS. As such, they were taken into account in the design of this research and strategies developed to reduce the associated problems, in order to ensure the quality of the work remains high.

1. The popularity of CAQDAS means that many new users are keen to use it without giving proper consideration to how it fits into the wider research design. As such, the relationship between methodology and software is often missing from the research accounts. To clarify the approach to this important issue in this research, CAQDAS is used as a central part of the analysis process (not separate as has been reported elsewhere by Fielding 2002 and Weitzman, 2003), and is subservient to the overall research methodology.

2. Many researchers, particularly those new to CAQDAS (Gilbert, 1999), tend to become too close to the data, leading them to unconsciously 'overcode', and become trapped in what is referred to as 'the code and retrieve cycle', 'coding trap', or 'coding fetishism', (Richards 2005, Johnston 2006). Becoming 'bogged down' in this way often renders the finished product suffering from a lack of trustworthiness and credibility (Di Gregorio, 2003). In order to avoid these problems, the advice of Johnston (2006) and Gilbert (2002) was followed, which stresses keeping a research journal and using it to record important decisions, reflections and new ideas.

3. There is a distinct lack of software training and support which adequately integrates CAQDAS and overall qualitative methods training (Carvajal 2002, Johnston 2006). The resulting short-term training courses are overly concerned with teaching the technical aspects of the software (Carvajal, 2002). This issue was identified and addressed early in the research process using three approaches: 1) a member of the supervisory team became involved in the CAQDAS learning experience to develop similar knowledge reference points, 2) the same member of the supervisory team became involved in dual-reading of methodological literature to ensure a rounded rigorous methodology knowledge was developed, and 3) the same member of the supervisory team was given access to the electronic CAQDAS project, thereby enabling them to interrogate the work which, in turn, enabled more effective supervision sessions.

4.5 Summary

The overall research design was presented in this chapter in order to substantiate the approach taken. The theoretical perspective, methodology, methods and analysis were all developed, and integrated with one another, in such a way that they meet the needs of the research problem in the most effective manner in order to provide fitness for purpose.

The chapter started by exploring the need to adopt a theoretical perspective, and found that the field of construction management does not benefit from a unifying theory. As such, a Grounded Theory (GT) was adopted in order to allow new issues to emerge from the data and develop into new theory. The appropriateness of a GT approach in the field of construction management was underlined by referring to other research in the field which has similarly adopted this approach. The debate about inductive research sensitised the reader to one of the most important issues in GT; should prior knowledge be taken into account in the research or not? Taking a pragmatic approach to the clear and undeniable existence of previous knowledge, this research adopted a modified form of GT, which accepts existing knowledge, and thereby purposefully takes account of existing literature.

Methodology was discussed next, and the mixed-method approach, which utilises both qualitative and quantitative approaches, was justified by explaining the mixture of depth and breadth that the case study and survey approach respectively provided. The field of construction management has recently been called upon to adopt mixed-method approaches, or as Dainty (2008) calls it in his appeal to the community, 'methodological pluralism', in order to provide an overall framework to understand the complex situations, and relationship networks, in the industry. The case study offered the additional benefit of being able to study the same issues from the multiple perspectives of the different parties involved in the study. This particular benefit was of key importance in this research as understanding tender processes at different levels of the supply chain, for example main contractor-subcontractor, relied on being able to isolate specific issues which occur in a particular context, and project-specific situation, and study the views of different parties in relation to the issues.

The next section discussed the methods employed in the research: a postal questionnaire, semi-structured interviews, expert focus group, listening days, literature review and statistical analysis of company data. The questionnaire survey was developed from the issues which emerged from the interviews, initial focus group and literature. It was carried out relatively early in the research and focused on client-main contractor tender processes, in order to understand how common the issues were over a larger population. Stratified random sampling was carried out on the three subsamples of clients, contractors and consultants who were identified from a sample frame collated by the Emap Glenigan database from UK wide planning applications. Each subsample consisted of 220 organisations, and a response rate of 20% was achieved, which was roughly proportioned equally over the three subsamples.

Semi-structured interviews, closely associated with GT, were used to allow new issues to emerge, whilst allowing predetermined topics to be discussed. An interview guide was used to structure the interviews and it was continually updated throughout the research. After commencing with an expert focus group interview, 65 participants were formally interviewed, some numerous times as part of the peer review process, and all interviews were fully transcribed. A number of subcontractor seminars were held across the country as part of the case study, and this allowed approximately 600 subcontractors to be informally interviewed as part of the study.

An expert focus group was formed by the main contracting organisation (the core case study organisation) and met regularly over the course of three years to assist in developing the findings from the case study. Two ’listening days’ were also held with subcontractors, and clients, in order to enable issues to emerge in a group environment, and provide an opportunity to gain feedback on the developing analysis. Company data from the main contracting organisation at the core of the case study was also analysed. Finally, a literature review was carried out contemporaneously with the data collection. The review used UK and international sources, thereby enabling the work to be grounded in existing knowledge and the gaps in literature to be clearly identified. Access to participants was helped by the PhD-level nature of the work and the perceived status of the project as it attracted government funding, received a prestigious award and led to the production of numerous outputs. In addition, the fact that the case study was sanctioned at a high level by the main contracting organisation helped secure access.

The chapter concluded by considering the analysis process carried out for the postal questionnaire, and interviews. The postal questionnaire was analysed using SPSS. Owing to the distribution of data in the completed questionnaires, the statistical analysis was limited to descriptive statistics including mean, median, mode average calculations and frequency counts to avoid violating the assumptions of the chi-squared test of association. The interviews were analysed using CAQDAS, and the resulting core categories were used to structure the findings as presented in chapter five and six of this thesis. Care was taken to avoid some of the problems associated with using CAQDAS such as the belief that it is a research methodology in itself, over-coding and an overly technical focus on the software without taking account of its place in the wider methodology.

Chapter 5: Client-Main Contractor Tendering

5.1 Introduction

This chapter examines the findings relating to how client-main contractor Design and Build Tendering is carried out in practice. It commences by exploring the reasons why developed forms of Design and Build, where greater design and specification development are carried out prior to contractor involvement, found to have become more popular. Tender practice associated with these types of Design and Build is then discussed, drawing attention to the importance of the compliancy of tenders. In addition, the important role that alternatives, and menu pricing, play in enabling contractor value to be added to such developed forms of Design and Build is explored. Purer and partially developed forms of Design and Build, where little design and specification development has been carried out prior to contractor involvement, are then discussed. The different tendering mechanisms found to be used in practice are presented, including the single stage 'beauty parade' and two-stage approaches. A Value Management (VM) based tender evaluation process which was developed during this study, is then explored in order to increase the effectiveness of this important value transition point. The chapter concludes by exploring a unique aspect of contractors' competitive tendering tactics relating to clients' propensity for early subcontractor selection.

5.2 Developed Forms of Design and Build

As discussed in Chapter two, Design and Build, as a family of procurement routes, incorporates a variety of different approaches to procuring construction projects. These different types of Design and Build principally differ based on the amount of design and specification development that has taken place prior to the contractor becoming involved. Despite this range of approaches being recognised (Janssens, 1991; Turner, 1995; Akintoye, 1994), there is still an overriding tendency for Design and Build to be characterised as the contractor providing a single-point design and construction service (CIOB, 1998; Ashworth, 1996, OGC, 2007).

This traditional view of Design and Build is characterised as incorporating much more complex tender mechanisms, owing to the requirement to differentiate between different contractor's tender submissions which include their own scheme proposals. However, the data suggests that Detail-Developed forms of Design and Build, which incorporate significantly developed design and specifications prior to contractor involvement, is increasingly being used in practice. The postal questionnaire carried out as part of this study points to the overwhelming dominance of Detail-Developed forms of Design and Build as summarised in figure 5.1 below.

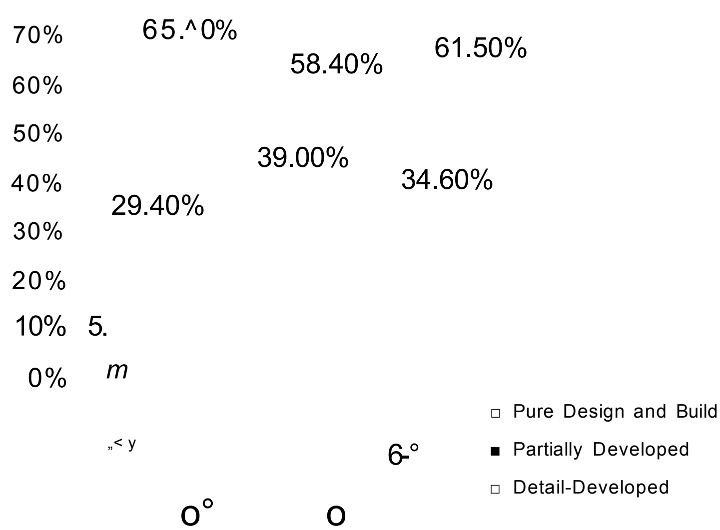

Figure 5.1 The relative popularity of different types of Design and Build

In its most extreme form, the design and specification is almost completely carried out prior to contractor involvement, and the contractor is left to carry out what is essentially detailed design work required to produce the building as articulated in the contract documents. A director of a large-scale nationwide contracting organisation outlines the situation:

What the clients do is develop the scheme to such an extent that it is almost completely drawn, it's completely specified and what they are actually saying is "we want this work for a lump sum, we want you to take the risk on the coordination element and actually make it 100% work and we want you to take the responsibility for the late information and all the things that go wrong with Traditional contracting" and most of the Design and Build that comes out is of that type. Very few come out with "there's a blank sheet of paper, we want a 100,000 square foot office block"

The contractor's role at tender stage is often limited to pricing the project on a lump sum fixed price basis. Many respondents likened this type of Design and Build to Traditional Contracting, which has been subsumed under a Design and Build contract, in order to allow clients to transfer all of the risk to the contractor. These types of Design and Build limit the ability to integrate design and construction, which paradoxically was the reason why so many high profile UK construction best practice reports advocated the readoption of this procurement route (Emerson, 1962, Latham, 1994; Egan, 1998).

Various reasons were identified in the data to explain the move to more detailed forms of Design and Build. Risk transfer can be considered a central theme in the findings, with various related sub-themes as shown in figure 5.2.

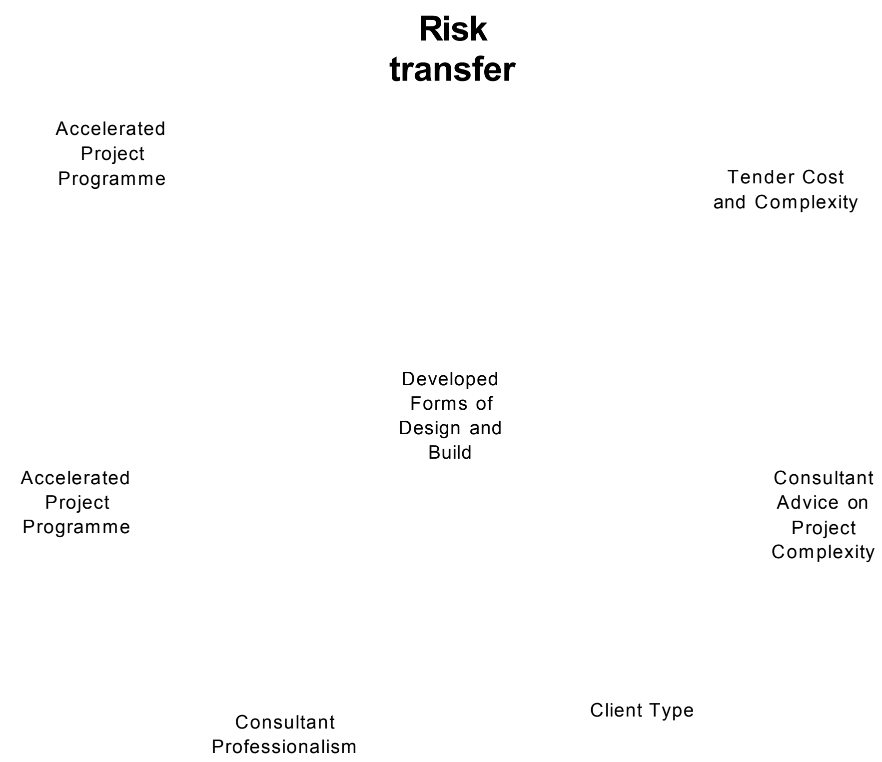

Figure 5.2 Reasons for Use of Developed D&B themes

5.2.1 Risk Transfer

The ability to transfer the risk for design and construction, to contractors, by using a Design and Build contract is increasingly driving the decision to utilise developed variants of the procurement route. Participants involved in the study forwarded this reason as their principal decision when choosing which procurement route to use. Figure 5.3 below shows the proportion of clients, consultants and contractors identifying risk transfer as their principle choice for using Design and Build.

Figure 5.3 Participants using Design and Build principally for Risk Transfer

Effectively aping Traditional Contracting, developed types of Design and Build ultimately incorporate a different risk profile, which leaves the client able to offload much more of the risk for the construction project to the contractor. An interview participant, a senior Quantity Surveyor working for a large nationwide contractor, outlines a typical view of why Detail-Developed Design and Build is being used for risk transfer purposes, by making reference to a particular project:

> *it was actually risk transference, the design wasn't even important because the client had already concluded the design. All they were trying to do was button down the responsibility for both construction and design and any variations that would ensue from the design being incomplete or in error would be absorbed as a risk by the contractor, unlike a Traditional Contract, where the design responsibility lays with the client and his designer. What the client is trying to do is take away the risk inherent in employing a designer because it's very rare that a client will sue their designer unless it's a serious breech. On the other hand, it's quite clean and tidy for all the responsibility to lie in one camp and there's no need to sue anybody, you just say "well it's your problem, solve it" to the contractor, so they're using Design and Build for risk transfer*

The contractor goes on to draw attention to one particular type of risk; cost certainty:

> *Under the Traditional route there is no cost certainty until the final account is agreed, whereas with Design and Build, the cost certainty comes as soon as the contract is let unless the client changes his mind.*

This transcript excerpt is particularly interesting as it draws attention to how it is not just the client's design risk that is reduced in Design and Build. The client's cost risk is also reduced as the tender price should, in theory, equate to the final account sum (the final price paid to the contractor to complete the works), in situations where the client does not initiate design changes.

The contractor's single point responsibility, and contractual undertaking in Design and Build, allows the client to avoid the unsatisfactory risk profile associated with Traditional Contracting. Developed forms of Design and Build enable the client to develop the scheme using their own consultants in the same way as they would in Traditional Contracting. Turner (1995) does not believe detail-developed forms of Design and Build should be included within the Design and Build family: *'This is hardly design and build in concept and could lead to confusion of responsibilities...'* (Turner, 1995: p.23). This view is shared by the same participant and is common amongst those interviewed as part of this study:

> *So to call this type of Design and Build true Design and Build is true because it is the same form of contract, but in terms of method of delivery it's not real Design and Build it's actually something quite different, as the design is not carried out with the contractor, they just assume design responsibility*

5.2.1.1 Tender Cost and Complexity

The increased complexity, and associated higher tender costs, of tendering for less well developed forms of Design and Build, was also uncovered in the data as a reason for the popularity of Detail-Developed Design and Build. The higher tender costs particularly affect contractors who, depending on the nature of the Design and Build tender competition, can expect to incur substantial tender costs which they are at risk of not being able to recoup, should they not be awarded the contract. A participant gives an example of the type of costs that main contractors can incur when involved in what can be termed 'purer' forms of Design and Build.

> *...we had external fees, and these were at cost from a multi-disciplinary practice for architects and engineers' fees, they were £30,000. Now if you added in our internal fees, we had spent £100,000 and this doesn't seem to me to be an effective use of everyone's time and the degree of costs seems out of proportion to the reward available for the project*

In this type of Design and Build, the contractor develops a design solution to meet the client's needs whilst still in competition with other contractors. This highlights how a number of contractors, in this situation, incur significant costs leading to substantial overall tender inefficiency and resulting price inflation.

Such high costs are important considerations for contractors who are asked whether they wish to tender for Design and Build projects. Reducing the inefficiency of the tender process has been a recurrent theme in construction best practice discourse as highlighted in the literature (Simon, 1944; Banwell, 1964; Latham, 1994; Egan, 1998). The costs which contractors incur during tendering must ultimately be recouped through their successfully secured construction projects. This means that the cost of inefficient tender competitions can lead to upwards price inflation in the industry. However, tendering for purer forms of Design and Build need not necessarily equate with over complexity, or indeed, overly inflated tender costs, as will be explored later in this chapter by presenting a VM-based tender evaluation process, developed in conjunction with practitioners involved in this study.

5.2.1.2 Consultant Advice on Project Complexity

Architects often take the role of the client's advisor, providing them with a range of different services including advice on which form of procurement route to use. The data suggests that architects often advise their clients to use more developed forms of Design and Build for complex projects. Interestingly, such advice contrasts with the findings of Bennett *et al* (1996), who found that Design and Build led to better quality when compared with Traditional Contracting for innovative and complex schemes. One architect outlines his views on developed forms of Design and Build:

> *I think the further one can go before you tie yourself down with Design and Build, the better. If the client is really keen on the advantages of D&B, then you will certainly try and push him down to not going out to tender until you've done stage E for example or G, but that allows more to be done than a performance specification, unless he's just doing a simple shed. I mean, we would really try and urge him away from it at stage C because we think it foolish*

The architect is keen to develop the design in isolation of the contractor until a late stage for complex buildings. This is perhaps not surprising, as architects benefit from more guaranteed work where they develop the project to more advanced stages. A private practice quantity surveyor who explained that he often advised his clients to use Design and Build, despite the client's architect's advice to use Traditional Contracting or Detail-Developed Design and Build, highlights the point about architect's fees:

> *...a number of architects who we work with will push clients to use a certain procurement route because of fees*

Many contractors were acutely aware of architects' strong views on this issue, and how these views were regularly repeated to the architect's client base. Contractors were keen to point out that many of the benefits associated with Design and Build were lost where clients followed their consultant's advice, and postponed contractor involvement until scheme development was already well advanced. For contractors, the architect's advice was often based on an inability to accept their changing role under Design and Build, where they ultimately report to the contractor as opposed to the contractor reporting to them, as was the case with Traditional Contracting. When questioned whether he believed that involving a contractor earlier to develop the project would lead to benefits such as buildability, the same architect had this to say:

> *I actually reject the idea that Design and Build offers advantages of buildability, I don't really think it does. Assume you get a competent architect and engineer and so on. A professional team is capable of producing much more buildability than a contractor. The big thing is to delay the tender as late as you can so that the design team has a better chance to draw out of the client exactly what he wants and produce specifications that are tighter...*

These comments point to the architect's belief that not only are architects better suited to articulate the client's requirements, but that contractors' desire to generate profit is greater than architects' desire to generate profit; a situation which leads to problems for the client. Accepted simply without question, it is easy to see why clients would find such advice from an ostensibly impartial party so plausible. However, many participants in the study were keen to offer the opposite view, that getting contractors involved earlier in scheme development did indeed lead to benefits; one of which was buildability.

5.2.1.3 Client Type

Another factor closely related to project complexity is the type of client using Design and Build. The data suggests that end users, who are clients intending to occupy and use the finished construction facility, are more likely to use prescriptive specifications. The logic employed is that as the client is interested in the ongoing operation and maintenance of the facility, and its whole life cost as opposed to capital cost, they are keen to use prescriptive specifications which mirror their lifecycle aspirations. However, this logic fails to take account of the way that contractors often have significant experience of ongoing operation and maintenance issues, particularly where their business encompasses facilities management departments.

Similarly, the data suggests that in instances where the client requires a new project to fit closely with existing buildings, they are more likely to develop the specification, to ensure a closer match with their existing buildings for ease of operation and maintenance. A senior surveyor working directly for a client with a large property portfolio, matching this profile, discusses his views on the matter:

> *I think we've got it right in that we know we what we want to tell them and that's fairly clear what we want. We've carried out work to a large part of the estate already and obviously it's sensible for consistency for maintenance purposes and general appearance of the site and durability and the way the site stands up in use and that what's built matches, what's already here and that's what we've set out*

5.2.1.4 Consultant Professionalism

Linked to the previous point, the data suggests that some clients are choosing to use developed forms of Design and Build as they offer many of the benefits of Design and Build, yet allow them to develop the scheme with architects, who they believe work more professionally than clients. Clients adopting this approach often do so on the basis of their consultant's advice. An architect involved in the study gives an indication of the type of advice his clients are likely to receive:

> *The trouble is you know contractors are obviously more commercially led than we are, not always, but there is always a risk with Design and Build that you are going to get lassoed by the contractor's profit rather than his desire to maintain reputation*

However, it would seem that this is an issue which strongly splits opinion; whilst some consultants take this view, many clients and contractors strongly disagree. These clients and contractors support their view by drawing on the fact that many contracting staff are members of professional bodies and are required to adhere to their ethical and moral codes of practice. A director of a large-scale contracting organisation raises this issue when discussing his beliefs about how contractors should be more centrally involved in projects:

> *Open mindedness is the key to making things work, that and a lack of the old-fashioned view that the contractor does as he is told and has nothing to offer when it comes to design and ideas. There are very traditional architects who think "we are the professionals, we do the drawings, you work to those drawings" and they have a veryjaundiced view as to what we can offer. I think contractors today have been the university route and we've all got equivalent qualifications and for every one contract that an architect places, we will place at least 30, so who's better at placing contracts?*

Approaching Design and Build in the spirit of integrating design and construction, and recognising the different risk profiles, when compared with Traditional Contracting, will enable better use to be made of what is intended to be a procurement route able to integrate design and construction.

5.2.1.5 Accelerated Project Programme

Design and Build is known for its ability to offer overall accelerated timeframes (CIOB, 1988; RICS, 1996; Bennett *et al,* 1996). Where clients are particularly keen to specifically condense the *total time* contractors spend working on site, such as in retail and education environments, they often choose to increase the amount of design and specification development work which takes place prior to the contractor becoming involved. This is in contrast to the use of two-stage Design and Build tendering, which can be used to develop the scheme with one contractor to an advanced stage prior to starting on site.

The ability to work in a condensed period on site should not be confused with the benefits of actually *getting started on site earlier* in the overall project cycle which purer forms of Design and Build allow. A surveyor working in a client's procurement department clarifies his view:

> *I think that the original thing about Design and Build was that you get on site quicker because there is no upfront design as such and it's just "here's my piece of paper with a square on and I want a factory" and you get on site fairly quickly because you are not having to go through the process of all the design being carried out beforehand. I think the way that its being done here is different, it's not the speed of getting on site quickly, it's just a method of saying "well right, this is what we want, you've got all the information here it's over to you Mr. Builder"*

Exceptions to using Detail-Developed Design and Build to condense the time spent working on site, include framework type Design and Build, which often takes place in an education environment. This type of work, which falls outside the scope of this study, often incorporates very pure forms of Design and Build, where a limited number of contractors develop projects from a very early stage.

Having explored the reasons for the popularity of Detail-Developed forms of Design and Build, attention turns to consider the nature of the client-main contractor tender process.

5.3 Tendering

5.3.1 Tendering for Detail-Developed Design and Build

In contrast to the complexity, and cost, associated with 'purer' forms of Design and Build, Detail-Developed forms of Design and Build utilise relatively simple tender competitions. These tender processes represent little difference from those employed for Traditional Contracting. These schemes are often so well developed, prior to the contractor's tendering for the works, that the process tends to follow the follow depicted in figure 5.4 and explained overleaf:

STAGES

MAIN ACTIVITIES

Pre-qualification multiple criteria evaluation

Pre-qualification

Rank scores - highest ranking contractors invited to tender

Inform unsuccessful bidders and debrief

Mid-tender meetings and proposal development and submission.

Proposal development

Discuss nature of compliancy with tenderers.

Proposal evaluation

Proposals acceptable?

No

Inform unsuccessful bidders and debrief

Yes

Reconsider contracting organisations and select lowest capital cost proposal

Figure 5.4 Lowest Cost Selective Tendering

1. Prequalification.
2. Four or six, successfully prequalified contractors, price the tender documents, without the requirement to interpret the client's needs and propose solutions.
3. The contractors will check the client's design to ensure it can be built as specified. Generally the work is split into different trade packages to be priced by subcontractors.
4. The contractors will each agree their tender sum and submit this to the client.

5. The evaluation process will generally follow the process of identifying the lowest priced tenderer, or tenderers where their prices are closely placed, and checking the Contract Sum Analysis(CSA), to ensure the cost allocations are representative of the works
6. The tender will be checked for compliance with the tender documents. This aspect will generally require an element of dialogue with the lowest priced tenderer(s), and possibly some negotiation over different issues, prior to the contract being formally awarded to the contractor.

A head of the construction procurement department at a large education client, summarises the evaluation process for detail-developed Design and Build, by making reference to a specific project:

> *When we prepare our tender document we include a Contract Sum Analysis which splits down all the construction elements from substructure through to finishings. So we tend to evaluate initially on price by checking what they've included. In this particular instance there were three contractors who were very close so we checked what they'd all included and whether they were compliant and then chose the lowest*

Interestingly, this advice, to select the lowest priced contractor, seems to contradict the overwhelming body of construction best practice literature, which advocates selecting on the basis of best overall value for money (Latham, 1994; Egan, 1998; CIRIA, 1998; OGC, 2007). A quantity surveyor, who regularly carried out Design and Build tender evaluations, had this to say on the issue when discussing a particular client he worked for:

> *Generally speaking, I know this sounds horrible, but the cheapest gets the job. I don't know whether it is their policy, which means they can't accept anything other than the cheapest tender. Certainly we know about*

Latham and Egan, which say that cheapest is not necessarily the best, but I think we are obliged to say that if someone has submitted a compliant bid which is the lowest of the six that we received, then that is the one we should accept unless it is ridiculously low and they have obviously bought the job

This participant is clear that, although they recognise the message forwarded in Latham (1994) and Egan (1998), they still select on the basis of the lowest priced tender. A senior project manager, working for a large client, had the following to say on the main criteria for tender evaluation:

All contractors should beware that at the end of the day if you can put a compliant bid in, and you are the cheapest, you will win the job, I mean it's competitive tendering isn't it?

It is worth pointing out that the prequalification process, associated with this type of single-stage Detail-Developed Design and Build, leads to each contractor being ranked and only the highest scoring contractors being able to eventually tender.

In situations where the client's value system is used to develop the prequalification criteria, then such a tender process can be orientated around a value-based selection. Holt (1995), has developed a body of work which can be used in this respect, although few participants were aware of this work, or indeed any other work dealing with tendering, other than the standard codes of practice. Practitioners involved in the study helped to develop the following tender evaluation process. In this process, the prequalification scores can be brought forward and used in the evaluation process, in a price and quality assessment mechanism, as shown in figure 5.5.

STAGES

MAIN ACTIVITIES

Pre-qualification multiple criteria

Pre-qualification

Rank scores - highest ranking contractors invited to tender

Inform unsuccessful bidder

Mid-tender meetings and proposal development and submission.

Proposal development

Discuss nature of compliancy with tenderers.

Proposal evaluation

Proposals acceptable?

No

Inform unsuccessful bidder

Yes

Price/quality mechanism applied

Select proposal with best overall score from prequel evaluation and cost evaluation

Figure 5.5 Multi-attribute Price and Quality Evaluation - Prequalification Score

5.3.1.1 Compliant Tenders

The findings suggest that the compliancy of the tender is extremely important Compliancy is assessed by determining whether the contractor's tender complied with the terms set out in the client's tender documents. Farrow and Main (1996), believe that there are the two main reasons contractors qualify tenders: 1) either errors or lack of information in the tender documents, or 2) the intention to secure competitive advantage. However, the data suggests that in addition to these two reasons, contractors also qualify tenders in order to reject what they consider to be the unreasonable risk the client wishes to transfer to them through the Employer's Requirements document. A director of a nationwide contracting organisation stresses the need for contractors to understand the nature of the works on which they are tendering:

> *Part and parcel of the Design and Build tendering process is that the form of contract is amended such that discrepancies within the document fall to be our responsibility. So in the old days when there was a discrepancy within the Employer's Requirements documents you got paid, today you don't and there's a consequence which you spend a lot more time trying to find out what those discrepancies are before we sign on the dotted line so that we don't cop for the money later*

Another reason for qualified tenders is the poor relationship between the client's budget figure and the scheme as encapsulated in the tender documents. The increasing drive towards developed forms of Design and Build, and the big effect this has had on the amount of information contractors have to assess during the short tender period, is a recurrent theme in the data. This issue is not only recognised by contractors faced with compressed tender periods. For example, one senior procurement manager, working for a large client organisation, had the following to say when discussing a particular project:

> *When they tender for this job they get a lot of information, it's not just our tender document which was two volumes, that thick (indicates four inches with his hand), they get a full M&E (mechanical and electrical) specification, full architectural specification, architectural drawings, structural specification, M&E drawings, structural drawings. It's a lot and they only had four weeks to do it in. As always happens, they ask for an extension of time, which is understandable because they've got to, in theory, read through every piece of that information to glean what the*

university wants and that's where things are missed out, you know where they haven't read page 56

As can be seen, the significant amount of information which contractors have to read, understand and incorporate within their corresponding tender submission is significant. For Craig (2000), non-compliant tenders are not able to be used to form the basis of a contract. He points out that a tender which does not 'properly respond to the owner's request and stipulation is not responsive (not compliant) and therefore cannot form the basis of the tendering contract' (Craig, 2000: p.95).

Whilst the NJCC, by stating that bidders should not seek to modify their bids, and only bid on the basis of the same tender documents, appears to concur with Craig (2000), contractors interviewed as part of this study were less acquiescent. Many contractors believed that if the client was unable to accept qualified tenders, this would mean that the majority of tenders would be rejected, as they invariably contain some form of qualification which the contractor should bring to the attention of the client. An estimator working for a contractor had the following to say:

We wouldn't put a price on for something that we didn't feel was going to work, because you've got to think it comes into the realms of competent contractors really doesn't it?

Contractors interviewed stated that, where the tender documents contained unreasonable terms and conditions, and they brought this to the attention of the client, in many instances the client did not realise how unreasonable the terms actually were, and agreed that they needed changing. The reason for this lack of recognition is owing to the way that the client is often unaware of the terms and conditions being incorporated in their tender documents, as they are divorced from the process which is carried out by their consultants and legal advisors. In one particular instance, a contractor explained that a client they worked with had recently requested a £10,000 bond from contractors tendering for their works, in order to ensure that the contractors did not qualify their tender. The contractor explains his views on such practice:

> *If in their opinion we didn't put a compliant bid in they would take that £10,000 bond off us, and that's just an absolute nonsense, an absolute nonsense and they said "the other two contractors are accepting this" and I said "well we're not accepting it". It's a QS (Quantity Surveyor) driven project and he wants an easy life, basically he wants three compliant bids which he doesn't have to read through and he knows are fully compliant*

Interestingly, the contractor believes that the onerous conditions are in place to simplify the tender evaluation process. Some contractors stated that it was often the nature of the client which determined whether they strictly adhered with the tender guidelines and submitted a compliant bid. In instances where the client was more speculative, and concerned with the tender price, the contractor would often submit a non-compliant scheme if it led to a substantial saving. In contrast, where contractors believed the client to be more concerned with overall quality, and adherence to tendering procedure, such as with public sector clients, contractors were less likely to submit non-compliant tenders.

5.3.1.2 Alternatives

Another issue linked to compliance is alternatives, which are offered in addition to a compliant tender. Where clients wish to use developed forms of Design and Build, the contractor's ability to add value is decreased. Indeed, the ability to harness the contractor's ability to add value is inversely related to the amount of design and specification carried out prior to tender, the greater the specification and design development, the less ability for the contractor to add value. However, many contractors challenge the design and specification developed prior to their involvement, and as laid out in the Employer's Requirements, as they believe that their input can add value through their valuable expertise. This research study found that 32.7% of contractors always submit alternatives in addition to their compliant bid, whilst 61.2% sometimes carry out the same practice. Moreover, the study found that 70.6% always investigate their own design, time and specification alternatives. Many contractors actively encouraged their staff to challenge the scheme, as laid out in the Employer's Requirements, as one director of a contracting organisation points out:

> *I think that is where contractors are good, at challenging everything and that's certainly the approach that I encourage my guys to take. Just because an architect says something or a structural engineer says something doesn't mean it's right, so challenge it. We have scored good points and won tenders on the basis of challenging engineers' designs*

The same contractor continued, by outlining a particular scheme where adopting this approach led to substantial savings, and ultimately his organisation being awarded the contract:

There was one housing scheme we did which included putting a road across very poor ground next to an attenuation tank and the engineer, employed through the architect for the employer, had got a scheme whereby all the duff material came out and was stabilised before being put back which was horrendously expensive. We came up with a geo-textile membrane and some remediation to the top metre as opposed to five metres, as the engineer had wanted, and we won the job on the basis of our revised scheme, so it's all about challenging things

Alternatives allow contractors to add value to Detail-Developed Design and Build projects, and as such help to realign developed forms of Design and Build with the original doctrine of contractor integration. In this way, alternatives help clients inject contractor-led value into their schemes, following the central message in UK construction best practice literature, particularly Holt (1995) and CIRIA (1998). An important point to note is that alternatives should be submitted as an *addition* to the compliant tender. This research study uncovered examples where contractors had simply submitted their alternatives in place of the compliant tender, and were subsequently rejected by clients.

Alternatives take many forms, such as different materials, methods of construction, programme and work phasing, and even include the contractor stating their intention to use different novated consultants. Alternatives are also offered by contractors following the selection process, yet they are mainly used to create competitive advantage during the tender process and stem from contractor's own ingenuity, or that of their supply chain, principally subcontractors (a point explored in greater detail in chapter six of this thesis). A contractor outlines the importance of creating competitive advantage at tender stage:

There's got to be an edge, you must always find an edge and have an idea because otherwise you are just pricing the same drawing that everybody else has got, so the way to win is to actually say "right, this drawing doesn't work or this other aspect isn't right and we're going to do it differently"

The importance that contractors believe alternatives have in securing their success at tender stage is evidenced in the survey data. Eighty percent of contractors believed that their offer of alternatives, at tender stage, helped them to win tender competitions. Whilst contractors were keen to use alternatives to gain competitive advantage, they were also keen to protect the erosion of their potential advantage, and as such kept the details of the alternatives vague to avoid clients disseminating their ideas with other contractors. A senior estimator working for a contracting organisation stresses the need to keep details of alternatives vague at tender stage:

We put in to use an alternative suspended ceiling tile in lieu of the one specified in the tender documents giving a saving of £5,000 and it would just be a round figure because if we give all details of the saving, and our tender was not the cheapest, the client may not even be talking to us and if we've shown our hand the client may use our idea with the cheapest contractor. We always like to think it's a bit of a hook to get the client to talk to us

The inability to develop more detailed alternatives, in what is generally considered to be overly short tender periods, is another reason that alternatives are often vague and undeveloped. Put simply, the contractors involved in this study invariably state that they often do not have time to challenge the scheme as encapsulated in the tender documents in the way they would ideally like. Where they are able to develop alternatives, they rarely have time to do anything other than identify potential alternatives.

We wouldn't go to any great extent probably for tender until we knew our offer was of interest, because you have also got to appreciate that the production of all this information takes quite a lot of time and effort and there is only a restricted time period for the tender and to actually produce all that information in that time is quite hard work

Contractors' belief that they have insufficient time to tender on Design and Build projects is highlighted by the responses to the questionnaire survey. Figure 5.6 shows contractors' responses to the question 'Do you believe you are given enough time to tender for D&B projects?'. Their overriding belief that they are not given sufficient time is clear to see.

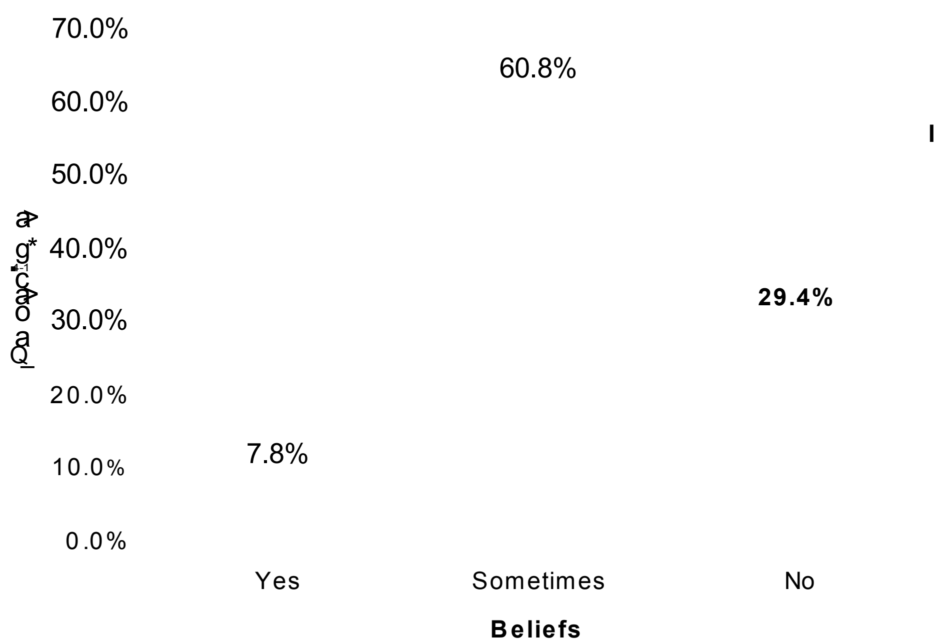

Figure 5.6 Contractors who believe they have sufficient time to tender for Design and Build projects

In contrast, 50% of consultants, and 62.5% of clients believed contractors had enough time to tender, pointing to a lack of shared understanding about this important issue. The study found that not all clients are keen to entertain alternatives at tender stage for the following reasons:

1. The time involved in evaluating alternatives. As tender periods are already very compressed, many consultants pointed out that the often significant time involved in evaluating alternatives could not be incorporated. Consultants believed clients often underestimated the time needed to effectively conduct the tender process, something which also impacted on the fees consultant were able to charge for this important part of the project process. This issue becomes increasingly problematic when one considers the significant role the tender process plays in transitioning client value.

2. The client's lack of propensity to allow contractors to input into their schemes. Some clients, and their consultants, believed that the alternatives that contractors proposed would lead to a reduction in quality, and were solely aimed at increasing the contractor's profit margin. This view was associated with clients and consultants who had suffered previous quality issues for which they held contractors responsible.

3. The vague nature of many alternatives, something which is discussed above and linked to protecting competitive advantage and short tender periods, means that the client team find it difficult to incorporate them in their decision-making process at tender evaluation stage. The time taken to explore and evaluate the alternative, possibly requiring the contractor to submit further information, is often deemed too much by consultants evaluating tenders.

5.3.1.3 Menu Pricing

Whilst contractor-led alternatives are an important aspect of tendering practice, that help clients gain value input from contractors in developed forms of Design and Build, another type of client-led alternatives, termed 'menu pricing' also emerged during the study. Clients were found to incorporate their own suggestions for alternatives in their tender documents, in a type of menu pricing arrangement, so that every contractor tendering would price the clients menu of alternatives as part of their tender submission. Just over 24 percent of contractors had experience of clients incorporating menu pricing in their tender processes.

A head of a client's construction procurement division outlined his approach to menu pricing on a particular project:

> *The design included structural glazing, it's really expensive as you don't need any supports, it looks really nice, it's 'super dooper', so we said to the contractors "you price on that, but we also want alternatives for not using that and using X, Y and Z" and I think we put in their tender that 'these alternatives will be looked at and judged on this basis' so when we did our tender evaluation exercise, we'd got six of them on their compliant bids and then we also stuck in what the alternative prices would be if they used other types of glazing*

In this scenario, the client was keen to specify their own menu of alternatives, in order to gauge whether they make changing the specification worthwhile. However, the same client was also keen for contractors to make their own suggestions to meet the menu of alternatives, as shown overleaf and this practice was found to be relatively common in the data:

Sometimes we will ask for alternative bids, say on time, where we will stipulate 50 weeks and we will say "right, that's the specification, but you tell us how many weeks you need to do it", so if they come back in at 40 weeks you save money on prelims

As such, menu pricing often incorporates one alternative proposed by the client, in addition to allowing the contractor the opportunity to propose their own alternative to the same aspect of the project.

Having explored various issues surrounding Detail-Developed forms of Design and Build, focus now turns to consider what can arguably be termed 'Pure Design and Build', which involves minimal design and specification development prior to contractor involvement.

5.3.2 Tendering for Pure Design and Build

As explained, the data overwhelmingly suggests that pure forms of Design and Build, where the contractor is involved early to help develop the scheme, and often works direct with the client (or as part of a team including the client's consultants), is rarely being used. It should be noted that pure forms of Design and Build do still often form part of larger procurement frameworks, such as the Private Finance Initiative (PFI), or the Local Improvement Finance Trust (LIFT), but these procurement frameworks fall outside the scope of this study. As explained, clients are increasingly using developed forms of Design and Build, which have the potential to negatively affect Design and Build's ability to transition client value through the supply chain. Where pure forms of Design and Build are used, they tend to take the form of two-stage tenders (both with, and without, an element of initial proposal development), single-stage 'beauty parade' approaches, or negotiated Design and Build (which similarly falls outside the scope of this study).

It should be noted that in practice, the two-stages tenders were often found to be poorly delineated, with some contractors openly venting their frustrations around this issue. This issue was similarly acknowledged by Turner who stated that:

> Mention has been made of two-stage competition and logically there may be quite a number of stages, however imprecisely they may be identified (Turner, 1995: p. 106).

5.3.2.1 Two-Stage with Initial Proposal Development

This type of two-stage tendering can be considered a sub-set of pure Design and Build, and was found to be becoming increasingly rare, owing to the way a number of contractors incur costs at the first stage of development. In this scenario, the contractors will typically develop part of the scheme iteratively with the client and their consultants. Whilst contractors are keen to secure the contract through demonstrating their proficiency in design management, and overall expertise of this kind of procurement, they were found to be cautious not to divulge too much information. The reason for this caution is rooted in a belief that the client may share their ideas with other contractors, a situation not too dissimilar to their cautionary approach to alternatives in more developed forms of Design and Build.

It should be noted that with this type of tendering many contractors do not begin to develop any designs and choose to develop and submit a price for the outline project. However, such tenders are not easily evaluated as there is no baseline for comparability and often contain a temptingly low capital cost to interest clients.

In addition to the written tender submission, contractors are expected to present their proposal to the client as a type of sales opportunity. Clients evaluate these submissions using multi-attribute analysis (MAA) techniques, following an Identify Weight and Rate (IWR) format. The successful contractor is awarded preferred bidder status and develops the project with the client and consultants in the second stage.

5.3.2.2 Two-Stage without Initial Proposal development

Contractors and clients found to be using this type of tendering mechanism were almost invariably positive about its beneficial outcomes. The majority of two-stage tenders take this form, as they limit the work contractors carry out in competition. At the first stage, a number of contractors, possibly four or five, will be required to price schedules, preliminary items, declaring overhead and profit requirements and articulate their overall approach to managing the rest of the project. At the end of this stage, a preferred bidder will be selected to develop the project with the client, and possibly their consultants, with an agreement in place to compensate the contractor should the project not proceed to a position where a contract is agreed. A contractor outlines his preference for this type of Design and Build:

Two-stage is great when it comes along, we get involved early and really commit ourselves to doing the bestjob we can. You need a client who has faith in you, but we repay that tenfold

The same contractor explains that in his view, this type of procurement route is ideal for clients who are reluctant to adopt a fully negotiated ‘partnered’ style, and need to demonstrate that some form of competition has been carried out. These clients do want to involve the contractor earlier, and work more collaboratively, as experience has shown them the benefits that this approach can deliver. A contractor makes reference to a specific project he has just been involved in:

You’ve had a couple of meetings with the consultants, you’ve met the client a couple of times. I’m going from experience just recently as well, and then he says “yes we like you, we want to do this job with you, but we have got to show that we are tendering it”. In return we say “well fine, but if you turn it into a two-stage tender process, then we can work with you in the second phase”. We’ve worked with their consultants regularly, they know us, they like us, we like them, we’ll get the best price for the client, the best design facility for the guaranteed maximum price. To a certain extent two-stage tendering is for clients who are putting their toe in the water but don’t want to go down the whole partnering negotiated route

5.3.2.3 Single-Stage ‘Beauty Parade’

The data suggests that this type of tender competition is losing popularity owing to the heavy resource requirements, involved in developing the different proposals, and the difficulty of evaluating them once submitted. This type of tender competition was found to be carried out on pure Design and Build which has very little pre-contractor development. Janssens (1991) believes single-stage tenders are suited to partially developed forms of Design and Build, which incorporate performance specifications and identify the type of elevation and spacial layouts including the application for planning permission.

This type of partially developed Design and Build is, for Janssens (1991), the most popular of all types of Design and Build owing to the way that it provides:

> the dual benefit of controlling the design, so far, yet leaving the contractor the scope to inject 'buildability' and new ideas into the design development phase (Janssens, 1991: p. 41).

Generally, this approach follows the format of the different contractors developing their proposals, based on the Employer's Requirements and discussion with the client and their consultants, before submitting their proposals for evaluation. The amount of pre-contractor scheme development will vary and the Contractor's Proposals will generally include the contractor's own design to meet the client's needs.

The tenders on this type of Design and Build were found to be evaluated using MAA analysis techniques, which evaluate the proposals on different criteria developed to match the client's value system. Figure 5.7 outlines a tender process which does incorporate a multi-attribute price, and quality score, evaluation of the Contractor's Proposals.

STAGES

MAIN ACTIVITIES

Pre-qualification multiple criteria evaluation

S

Pre-qualification

/

Rank scores - highest ranking contractors invited to tender

Mid-tender meetings and proposal development and submission.

Proposal development

Discuss nature of compliancy with tenderers.

Proposal evaluation

Multiple criteria evaluation of proposals

No

Proposals acceptable?

Inform unsuccessful bidder

Yes

Price/quality mechanism

Select proposal whose proposals offer best overall price/quality score

Figure 5.7 Multi-attribute Price and Quality Evaluation - Proposal Score

However, whilst the ability to blend price and quality is relatively straightforward, lowest capital cost was still overwhelmingly found to be often the most important factor in evaluation once a threshold quality level has been met. This means that clients, and their advisors, are often choosing to reinterpret the high profile calls to select contractors on the basis of overall value for money (Latham, 1994; Egan, 1998), by agreeing an acceptable quality level, and then selecting on the basis of the lowest capital cost. Importantly, this means that whole-life costs are often not taken into account; thereby diminishing the opportunity to carry out a true value for money selection process.

5.3.2.4 Value Management-based Tender Evaluation Process

Taking account of the need to ensure client value is transferred through the various stages in the project cycle, particularly at the important tender transition point, a VM-based multi-attribute evaluation process was developed in conjunction with practitioners involved in the study. The process is based on the work of Green's (1992) simple multi-attribute rating technique (SMART), as discussed in chapter two of this thesis. The VM process, and individual techniques, should be developed to meet the particular context, the study identified the following two key points which are particularly pertinent to Design and Build projects:

- The pre-brief workshop - the very early discussion of the client's business case, where the client's priorities and, where required, procurement options, are discussed.

- The brief development workshop - Taking place following the decision to build, this stage develops the initial work into more tangible outcomes such as a performance specification (Kelly and Male, 2002). The client's requirements are also developed at this stage and should inform the criteria used in tender evaluation using the SMART technique (Green, 1992).

The overall process follows a six-stage approach which encompasses the initial definition of the client's value system, through to the selection of the main contractor. The approach is inherently flexible, as all six stages can be carried out in two workshops (the pre-brief and brief development workshops, referred to above), with stage one to four or stage one to five, being carried out in the first pre-brief workshop. The different stages are outlined below:

1. Stage One - Process Introduction

Taking account of the way in which many participants may be unfamiliar with the briefing, or VM process, this initial stage is concerned with explaining the approach, in order to educate participants. The use of an example project, ideally different from the actual project which will eventually be considered, to avoid closing down the creative process, helps to demonstrate the different parts and give participants a sense of ownership. This stage will include the development, and agreement of, groundrules such as the equality of participants input irrespective of their status in their respective organisations, in order to get the most from the process.

2. Stage Two - Scheme Objectives

The different participants are likely to have different views of the objectives of the project, and this stage seeks to understand, and articulate, these differing objectives in a creative way, so that they can eventually form the project design objectives. In the study, project participants were asked the question 'what would make an excellent community learning centre?'. The various participants, from a range of different backgrounds, recorded their ideas which were used in a group discussion aimed at consolidating their ideas. As an example, the following objectives were identified from the question shown above:

1. Disabled access.
2. CCTV.
3. Easy to clean and maintain.
4. Light and airy.
5. Useful for a range of community initiatives.
6. Comfortable meeting rooms
7. Vandalism protection.
8. Lockers for staff.
9. Good security.
10. Shows our community in a favourable light.
11. Enough space to seat 150 people in the main room.

The list represents a mixture of design objectives, and design solutions, for example 'lockers for staff is a design solution meeting the 'good security' design objective.

3. Stage Three - Value Tree Construction Demonstration

Using the example project, which was introduced in stage one, the participants are shown how to create a value tree. The educational aspect is important as the participants must develop their own value tree and this is unlikely to be successful if they feel overwhelmed by the task.

4. Construction of a Value Tree

Once constructed, the value tree will incorporate a measurable list of objectives which can be used to evaluate the contractor’s Design and Build tenders. The value tree is developed by referring to the list of objectives produced in stage three, and turning these into a hierarchy. Some objectives may be grouped, whilst some may also be further broken down into sub-objectives. As an example, the participants who developed the list of 11 objectives in stage three further refined these into the four main objectives of:

- Welcoming atmosphere.
- Efficient facility.
- Community landmark.
- Attractive work environment for staff.

Importantly, these relatively high level objectives, and much finer grained objectives were developed during this research, as there is no optimal way in which the tree is arranged. The participants, who had experience of more traditional briefing, were clear on their belief that this approach led to a much more representative, and detailed picture of their value system. A participant outlines his views:

> *It really lets you get an understanding of what's important and how it all fits together. I've definitely got a better understanding of my own, and others, perception of what's important and how important it is*

5. Stage Five - Weighting the Value Tree

Weighting the value tree allows the relative difference of importance, given to the different objectives, to be taken into account when evaluating the different solutions. Although such weighting can take place during the fourth stage, those involved in the study found that it was useful to begin ranking the different objectives at stage four. They also found it useful to revisit their initial ranking in a separate fifth stage following a period of reflection.

Whatever the format, each level of the tree should be considered separately and calculated in order that they each equate to unity. As shown in table 5.1, the high-level objectives are ranked in order, with the lowest ranked objective given the score often. The other objectives are scored in relation to this objective, followed by the scores being divided by the total, in order that they equal unity.

Rank	Objective	Weight	Normalised Weight
1	A welcoming atmosphere for all	50	50/125=0.40
2	An attractive work environment for staff	35	0.28
3	An efficient facility	30	0.24
4	A community landmark	10	0.08
	Total	**125**	**1.00**

Table 5.1 Normalised Weighted Objectives

This aspect of the process is extremely important, as it ultimately determines the relative importance that is given to the different aspects of the client's value system (and used to inform the client's requirements and subsequent selection of contractor). An example of a completed weighted value tree, developed during the study, is shown in figure 5.8 below, highlighting how the objectives and sub-objectives work together, and the potential for a much finer-grained categorisation system.

An 'excellent' community learning centre	0.40	A welcoming atmosphere for all	0.50	A 'safe and secure' place	(0.20)
			0.30	Ease of access for all groups	(0.12)
			0.20	A welcoming reception point	(0.08)
	0.28	An attractive work environment for staff	0.60	A manageable work environment	(0.17)
			0.20	Quality private office space	(0.06)
			0.20	Relaxed social space for staff	(0.05)
	0.24	An efficient facility	0.25	Flexibility in use	(0.06)
			0.25	Future adaptability	(0.06)
			0.25	Low maintenance costs	(0.06)
			0.25	Low operational costs	(0.06)
	0.08	A community landmark			(0.08)

Figure 5.8 Weighted Value Tree

6. Stage Six - Evaluate Proposals

The contractor's design proposals are evaluated against the value tree. This stage relates the various objectives, and their associated weightings, to the different contractor's proposals submitted at tender stages. Fundamentally, it represents the point at which the contractors are assessed against the client's value system, and as such can be considered the most crucial point in transitioning value between the client and main contractor.

The approach is based around selecting the contractor who provides the best overall fit with the client's value system, and although it leads to a numerical output, this should only be used to inform the decision-making process; *not* as the answer in itself. As part of determining the overall final value score for each contractor, the ratio at which price and quality will be equated to needs to be determined. Where life-cycle costing is incorporated as part of the tender process, these costs can be incorporated in either the cost, or quality, component of the equation. As can be seen in table 5.2, each criteria is assigned a score from zero to100, and the ultimate subjectivity of the process (including the final evaluation score), is explained by a participant involved the study who works for a client:

It's important to remember the problems with trying to measure value objectively. We know now that we can't do that, so we approach the task knowing that we are trying to improve the selection process rather than find the perfect answer

Where objective scores are available, these figures need to be converted into scores ranging from zero to 100, as with the subjective scores this can be carried out by converting the lowest operating cost to 100, and reducing the other contractor's scores on the same criteria, using the lowest operating cost as the baseline. Table 5.2 shows the quality assessment, highlighting how tender C provides the best overall design solution.

Assessment criteria	Weighting	Tender A		Tender B		Tender C	
		Score	Weighted	Score	ViWeighted	Score	Weighted
A safe and secure place	0.20	70	14.0	50	10.0	75	15.0
Ease of access for all groups	0.12	60	7.2	50	6.0	65	7.8
A welcoming reception point	0.08	20	1.6	20	1.6	70	5.6
A manageable environment	0.17	50	8.5	30	5.1	60	10.2
Quality private office space	0.06	70	4.2	50	3.0	60	3.6
Relaxed social space for staff	0.06	80	4.0	20	1.4	85	4.25
Flexibility in use	0.06	60	3.6	40	2.4	75	4.5
Future adaptability	0.06	70	4.2	35	2.1	70	4.2
Low-maintenance costs	0.06	80	4.8	40	2.4	70	4.2
Low operational costs	0.06	80	4.8	40	2.4	40	2.4
A community landmark	0.08	60	4.8	30	2.4	80	6.4
Total quality score			61.7		38.4		68.2

Table 5.2 Value Management Multi-Attribute Evaluation Matrix

The different contractor's tender prices are converted into scores in table 5.3, showing how the lowest priced tender is scored at 100. The more expensive tenders are scored correspondingly lower, as shown in table 5.3 below.

A	£4 387 000	7	93
6	£4 100 000	0	100
C	£5 535 000	35	65

Table 5.3 Tender Price Score Mechanism

The overall Final Value Score (FVS) can then be calculated, by comparing the scores for quality and price as shown in table 5.4.

A	93	0.7	65.1	61.7	0.3	18.5	83.6
B	100	0.7	70.0	38.4	0.3	11.5	81.5
C	65	0.7	45.5	68.2	0.3	20.5	66.0

Table 5.4 Final Price and Quality Tender Evaluation Matrix

As can be seen, tender C has the worst weighted price score (WPS) and the highest weighted quality score (WQS), but the combined FVS of 66.0 represents the lowest overall value score. In contrast, tender A has the median WPS, and WQS, which combine into a FVS of 83.6, representing the highest overall value score. A participant made the following comment following the calculation of the value scores during a tender evaluation workshop:

> *It makes sense to have a system as it removes a lot of the confusion and difficulty that comes from trying to get a group of people to agree. In effect it gives us a guide to help make better decisions*

This novel use of value management based tender evaluation mechanism, is able to show how a detailed, and thorough, exploration of the client's value system can be used to inform the contractor selection process. As such, it is a useful way to help ensure that the contractor's value system is effectively aligned with the client's value system, thus helping transfer client value through the project process and achieve greater overall client value from the construction process.

5.3.3 Contractors' Competitive Strategies

An interesting theme that emerged during the study was clients' propensity to favour contractor-led SCM, and the way in which contractors used specific tactics in response to this need in order to increase their competiveness. During the first stage of two-stage Design and Build, clients are increasingly keen to see evidence that the contractors tendering for their works have developed their approach to Supply Chain Management. Indeed, subcontractors play such an important part in developing the scheme that clients often encourage their contractors to attend presentations (with representatives from their subcontractors who would eventually carry out the work on key trades such as mechanical and electrical) if the contractor is selected. A client outlines his belief in the importance of an early team approach which includes the main contractors supply chain:

> *What we really want to see as early as possible is the contractor really thinking about how they are going to deliver the project if they are selected. We're all aware that it's the subcontractors who carry out the work, so it's much better if they know who they will be using from an early stage, it means we can all get down to focus on the project and put our energy where it's needed*

For contractors to know at such an early stage which subcontractor they will use if they are selected requires them to form some type of agreement with subcontractors. This generally means agreeing what is often termed a 'one-to-one agreement' (also known as 'single action'), with one subcontractor for each of the key trades. These agreements are generally formed on the basis that, if the main contractor is selected, they will employ the subcontractor. Whilst these agreements are sometimes formalised under a 'heads of terms' agreement, they are often carried out informally as a type of gentleman's agreement, and require both sides to act fairly as one senior surveyor working for a contractor points out:

Experience shows us there is often a benefit in going one-to-one with our key subbies (subcontractors) and we believe they will really get involved in developing the project. We've got to have experience of them and know that they won't lift their leg (act unfairly) and will keep their pencil sharpened (remain pricing competitive). On the other hand, we see more and more clients who want to know who our subbies (subcontractors) are and in that scenario we will be keen to develop an early team approach with people we can trust

This participant draws attention to the fact that the decision to select certain subcontractors, at an early stage, is informed either by the contractor's own procurement strategy, "*Experience shows us there is often a benefit in going one-to-one",* or by the client's propensity for early selection of key subcontractors. Attention is also drawn to the importance the contractor gives to these subcontractors remaining competitive and acting fairly throughout the process.

5.3.3.1 Subcontractor Selection

The way in which subcontractors are engaged to work from an early stage differs. Some contractors work with a number of key subcontractors, generally limited to one subcontractor per key trade, with an agreement to automatically select them when the main contractor eventually enters into a contract with the client. In contrast to this approach, which is still dependant on competiveness and the ability to agree terms and conditions, an alternative approach was found to exist which requires the subcontractor, who has been involved from an early stage, to still eventually tender for the works with a number of other subcontractors at a later stage.

Subcontractors will generally agree to such an agreement on the basis that any significant development work they carry out will be paid for, in circumstances where they are not eventually selected. In addition, the subcontractors decision to become involved is based on their belief that the knowledge they have built up on the project, allied to the relationships they have formed as part of the team, will significantly increase their probability of being selected. An estimator working for a large mechanical and electrical organisation had the following to say:

We often work with contractors from an early stage, sometimes on a handshake and on a 'if you get it we get it' basis, but at other times we will carry out work for contractors on a fee basis where we will eventually tender it like everyone else. We do very well most of the time working in this way and what we find though is that a lot of the time is that the client loves us and wants to keep us so they never get round to tendering it (the contractor) and we just negotiate over the rates and what's included. Even where we are tendering it with other subbies (subcontractors) we find that we've gone through a very steep learning curve where we know the job and we know what people want, so we often get the work anyway

The important role subcontractors play in Design and Build is one theme that emerged repeatedly during the study. Some clients are that intent on selecting a contractor with an integrated supply chain, that they expect contractors to be able to introduce them to their key subcontractors very early during the tender stage. Further, clients who wish to see evidence of this type of integrated working are often keen to become involved in the contractors subcontractor procurement decision-making process for key subcontractors.

5.3.3.2 Competitive Tactics

One particularly interesting aspect of contractors' competitive strategy, relating to the client's propensity to favour contractors who are able to demonstrate they have selected their key subcontractors, was uncovered during interviews with major contractors. In situations where clients stress to contractors that they expect the contractor to have pre-selected the subcontractors (who will carry out work on the key trades), some contractors actively disregard their client's wishes as part of their competitive strategy. Contractors following this approach base their decision on the fact that subcontract expenditure accounts for a significant proportion of the overall contract sum. Data shows that this expenditure ranges from approximately 70-75 percent of the contract sum. In addition, the key trades account for a large proportion of the overall subcontract expenditure as shown in figure 6.3 (in chapter six), which is based on subcontract order data taken from the case study presented in chapter six of this thesis.

Following this approach, contractors are keen to persuade clients that it is more effective to postpone the decision to select subcontractors until later in the project cycle. An important point is that these contractors are still aware of the benefits that an early team approach can deliver, yet they seek to postpone the final decision and include the client fully in the procurement decision-making process. In situations where significant subcontractor development work is required, these contractors will advise clients that the development work is carried out by a subcontractor employed on a fee basis. Following this, the work will be competitively tendered as the contractors interviewed believed this approach offers the benefits of an early team approach in conjunction with more competitively procuring subcontract works. A technical director working for a major contracting group outlines his approach:

I/Ve know there are benefits where subcontractors know they have got the work in the bag, but it can also lead to them being a bit too comfortable. So what we do is we tell the client "don't select at this stage, why would you want to decide how you are going to spend such a massive part of the contract sum without any form of competition? It's better for us all to sit down and really get an understanding of the job and then we can make these important decisions together. We can still get our supply chain involved to develop the scheme, but let's keep them keen

Recognising this is a risky strategy, the contractor goes on to outline how successful it has proved in reducing their competition:

So what happens is we turn up at the interview and you see all the other contractors filing out with their key subbies and then we go in with just me, my Project Manager and possibly a couple of other key guys and the client looks confused and goes "where is your supply chain?" and we sit down and calmly explain our approach by making reference to real figures and explaining how successful our approach has been and you can see their faces change. What I've found out from contractors I know who have gone in after us is that the client wants to know why they have decided to tie up such a large part of their expenditure so early and we find that that approach generally wipes out 50 percent of our competition in one fail swoop

5.4 Summary

This chapter has examined how Design and Build tendering is carried out in practice. As demonstrated, Design and Build is a family of procurement options characterised by the amount of design and specification development carried out prior to contractor involvement. As such, the conceptual categories of Detail-Developed Design and Build, which has significant pre-contractor design and specification development, and Pure Design and Build, with minimal design and specification development, which emerged during the research, were used to explain the two extremes of Design and Build found being used in practice. Whilst the terms Pure, Partially Developed and Detail-Developed Design and Build are merely useful conceptual containers which point to the amount of pre-contractor scheme development, the data suggests that there is an overwhelming movement towards more Detail-Developed forms of Design and Build.

The chapter commenced by reporting on the popularity of Detail-Developed Design and Build. This form of Design and Build limits contractors' ability to become involved in specification and design development, and as such, this represents a significant divergence from what is traditionally understood as the primary benefit of Design and Build; integrating design and construction through centrally involving the contractor. The reasons behind the move to adopt what is effectively Traditional Contracting administered through a Design and Build contract were then considered. The core theme of risk transfer was related to the lower order themes of tender cost and complexity, consultant advice on project complexity, client type and accelerated project programme.

The broad and expansive nature of the reasoning given by participants for the use of developed forms of Design and Build, gives an indication of how well ingrained this approach has become over recent years. Such reasoning stands in stark contrast to the prevailing UK construction best practice discourse which promotes integrated working, where the contractor takes an early and central role in project development. Fundamentally, developed forms of Design and Build significantly limit the ability to effectively transfer the client's value system through the numerous value transition points occurring throughout various stages in the project process between different members of the construction supply chain.

The next section explored the nature of the tender process for Detail-Developed Design and Build. The simplicity of this form of tendering, which is often based around relatively easily comparable tenders evaluated on the basis of compliancy and lowest cost decision criteria, was contrasted with the traditional view of Design and Build tendering as a complex and difficult process. This finding shows how the type of Design and Build is a key factor determining the nature, and complexity, of the Design and Build tender process.

The degree to which tenders comply with the Employer’s Requirements was found to be a key issue in the evaluation of tenders. As such, the next section explored the compliancy of tenders and showed how contractors often find it difficult to completely comply with the client’s scheme as encapsulated in the Employer’s Requirements. Such non-compliant tenders often result from the contractor’s belief that the scheme as encapsulated in the Employer’s Requirements cannot actually be constructed. Alternatives are often offered by contractors, in addition to a compliant tender, as a way for them to add value and generate competitive advantage over their competitors at tender stage. Taking account of the way that developed forms of Design and Build limit the ability to integrate design and construction, and enable contractors to add value, alternatives offer a useful way to reverse this situation and enable contractors to add value and reorientate Design and Build with its original integrative principles.

The benefits available from contractor input are similarly recognised by some clients using developed forms of Design and Build, and the next section explores the findings that these clients often incorporate a form of ‘menu pricing’ in their tender mechanisms. By allowing clients to specify their own alternatives for the contractors to price, often in addition to encouraging contractors to specify their own alternatives, this pricing mechanism similarly helps realign developed Design and Build with the tenets of integrated construction and value generation.

The next section explored tender processes associated with purer forms of Design and Build which have minimal pre-contractor design and specification development. Two-stage and single-stage approaches were explored including the presentation of a VM-based tender evaluation process developed during the research study. The VM-based approach represents a unique way of initially understanding the client’s value system, and then relating this directly to the different contractors tender submissions in one integrated process. The approach was seen as a simple and effective way to evaluate tenders on the basis of overall value for money on purer forms of Design and Build.

The exploration of tendering on Design and Build projects has reinforced the need to develop ways to integrate design and construction through the various members of the supply chain involved in the project process. As such, the next chapter explores the findings relating to main contractor-subcontractor tender processes and contractor-centric SCM.

Chapter 6: Main Contractor-Subcontractor Tendering and Contractor-Centric Supply Chain Management

6.1 Introduction

This chapter presents the findings from the case study focusing on main contractor-subcontractor tendering in Design and Build projects and contractor-centric Supply Chain Management (SCM). Attempting to increase the effectiveness of Design and Build tendering by focusing *solely* on first tier client-main contractor tender process, fail to take account of the need to transition value through the wider supply chain.

Viewing the whole project process as a value chain (Male & Kelly, 1992), draws attention to the importance of the different transition points where value is passed between different parties. These value transition points, or 'switch' points, take place at numerous tiers throughout the supply chain. In order to understand how value is transitioned at the main contractor-subcontractor level, and ensure contractor-centric SCM takes account of these issues, a case study was carried out triangulating literature, survey data, documentary analysis and one-on-one interviews. In this way, the case study enables multiple perspectives of the same issue, experienced in the same organisational and industrial context, to be explored.

Considering the value chain as a value 'thread', underlines the fragility of the transmission, transformation, and maintenance of value in a construction project, from inception through to completion and eventual operation (Bell, 1994). As stated, for every client-main contractor tender process that is carried out, there are a multitude of related main contractor-supply chain tender processes. Ensuring the client's value system is transitioned through this multitude of different tender 'switch' points, is a crucial factor impacting on the ability of the overall project to meet the client's value system.

Tender processes take place at various points throughout the supply chain and can be considered the key value switch points during the project cycle (Standing, 2001). The effectiveness of a procurement route hinges on how effectively it enables the transition of value through the various different parties comprising the construction supply chain (Kelly *et al,* 2004). The client's value system needs to be effectively passed through the supply chain, for example from contractor to subcontractor (and often onto sub-subcontractor), to enable the client's value system to be realised.

Design and Build, as a procurement route that integrates design and construction through the contractor, is believed to offer the ability to effectively transition value (Standing, 2001). However, this research has found that much Design and Build in use in the UK construction industry today, is carried out in such a way that the majority of design and specification development is carried out prior to the contractor becoming involved in the project. As such, the integrative benefits of Design and Build are diminished, thereby increasing the need for approaches such as SCM to aid the integration of the wider supply chain, in order to realise the client's value system.

SCM has been proposed as a way to increase the performance of the UK construction industry, owing to the way it can help integrate the different parties that come together to design and construct projects (Egan, 1998; Holti *et al,* 2000). Its integrative nature offers the potential to help ensure the client's value system is effectively transitioned through the multiple parties that make up the construction supply chain. As has been shown in this thesis, there is a lack of detailed guidance for those seeking to employ SCM in the construction sector, particularly client-centric SCM. Similarly, there is a lack of research focused on the multitude of highly important main contractor-subcontractor tender processes. This chapter addresses two considerable, and important, gaps in the literature in order to increase the effectiveness of Design and Build tendering:

- A lack of research focusing on main contractor-subcontractor tender processes.

- A lack of research into contractor-centric approaches to SCM.

The decision to focus on main contractor-subcontractor is informed by the following factors:

- Subcontractors generally carry out the majority of the work on a construction project. Data analysed during this research shows that subcontract expenditure generally accounts for 70-75 percent of the capital expenditure on construction projects, underlining its importance.

- Main contractor-subcontractor tender processes share many synergies with client-main contractor tender process as, depending on the nature of the subcontract trade involved, they incorporate design, management, labour, and plant and materials.

As explained in the methodology chapter of this thesis, a case study approach allows a range of different factors to be considered from different perspectives by triangulating between literature, survey data and interviews. Considering the problems associated with failing to take account of the situational context of SCM (Fisher and Morledge, 2002; Mouritsen *et al,* 2003), specifically the organisational and industrial context (Green, 1999), the case study approach enables the clients', contractors' and subcontractors' views to be incorporated into the study. As such, the tripartite case study enables a rounded depth of understanding of the key issues to be developed.

6.1.1 Case Study Context

A large nationwide main contracting organisation was selected as the core of the case study. Their involvement was greatly helped by their own wish to explore contractor-subcontractor tender processes such that they could develop their own approach to SCM. The contractor's wide portfolio of projects, ranging across numerous sectors and values, from £25 small works orders, to £150 million projects, provides a broad contextual base to the research. At the time the case study commenced in 2005, the contractor's annual turnover was in the range of £330 million and rose to approximately £750 million by its conclusion in mid 2008.

The contractor's turnover increased by £300 million in the last year of the case study following the acquisition, of part, of a large contracting organisation specialising in larger value Design and Build construction projects. The acquisition enabled the findings of the earlier part of the study to be reviewed by a large number of individuals from the newly acquired organisation, thereby providing an element of peer review. In addition, the company acquired by the contracting group specialised in larger projects, which allowed new issues to emerge.

Throughout the case study, the contractor won work both through competitive and non-competitive processes. The case study lasted three years and when it commenced, the contractor had been in business in its current form, as part of a large public limited company (pic), for three years, allowing issues to emerge and develop gradually. The contractor operated out of a number of regional offices. The contractor employed approximately 1000 staff at the start of the case study and this had grown, through acquisition and an active recruitment policy, to 2000 by the conclusion of the case study. Open access was granted by the contractor to their staff as part of the case study, and the staff represented a large number of functional specialisms, as highlighted in chapter four of this thesis.

Similarly, the contractor encouraged their subcontractors to become involved in the research. This request was met by a high proportion of subcontractors, whose staff became actively involved in the case study. The subcontractors involved represented all of the contractor's top 20 trades (by expenditure). In addition to representing all the contractor's operating regions. The subcontracting organisations ranged from owner-operator sole traders with a turnover in the region of £150,000, to large nationwide organisations employing hundreds of staff and whose turnover exceeded £100 million.

These issues are grouped thematically and presented under the headings of relationships and tendering issues as shown below in figure 6.1 and figure 6.2.

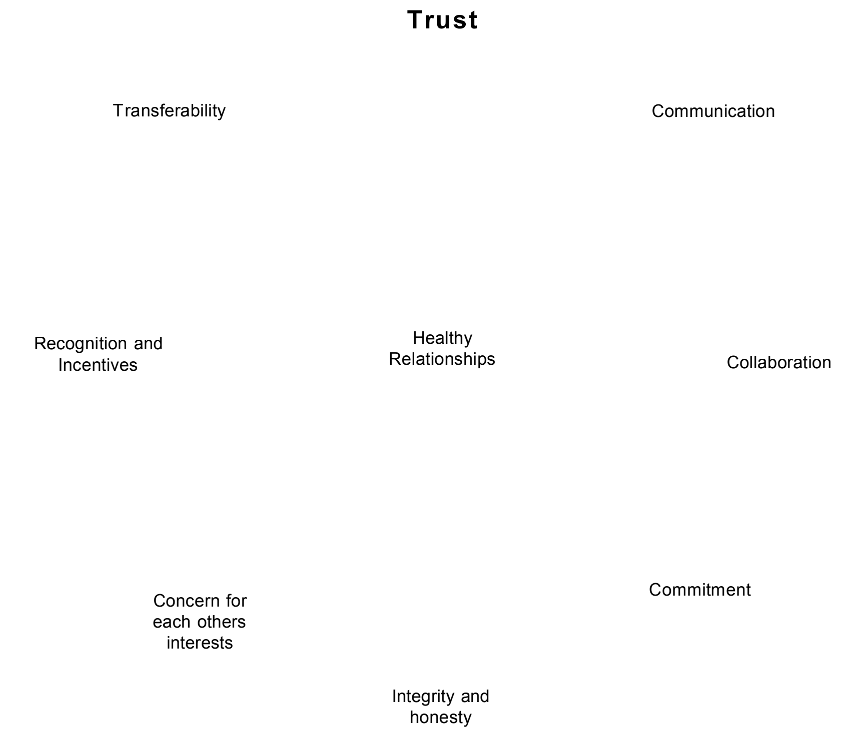

Figure 6.1 Relationship Themes

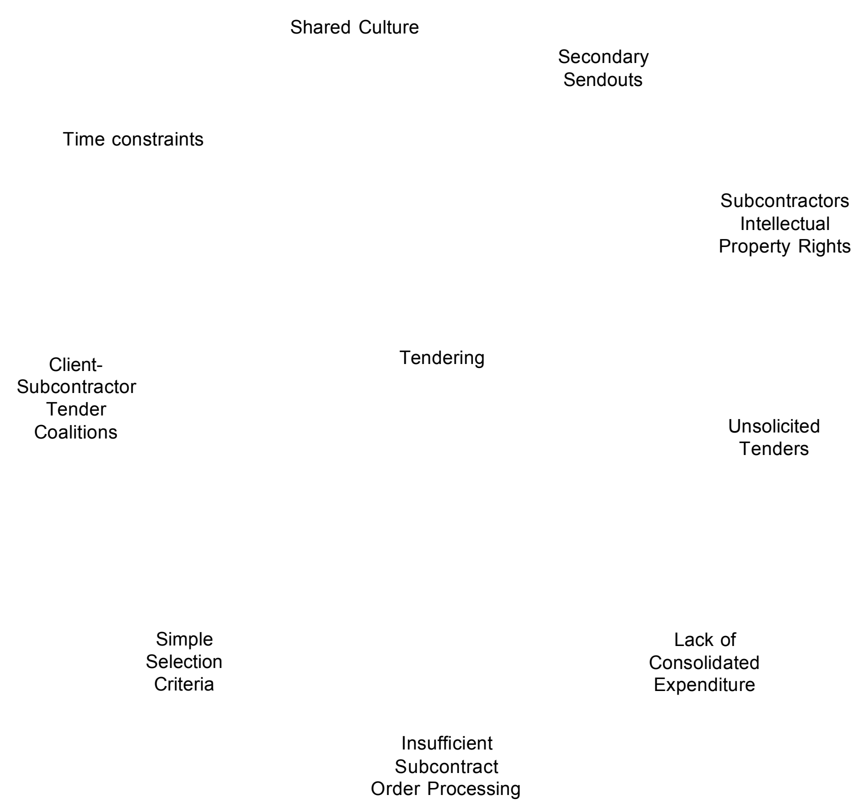

Figure 6.2 Tendering Themes

6.2 Relationships

Relationships were widely regarded as the most important issue by all participants involved in the study; a finding which concurs with a central strand of construction best practice discourse starting with Emerson (1962) and continuing throughout the years (Latham, 1994; Egan, 1998). Healthy long-term relationships, between main contractor and subcontractor, were considered to be the most important factor impacting on the ability to work effectively together and collectively focus on meeting the client's value system. The reciprocity of long-term relationships was widely recognised, as a contracts manager working for the contractor makes clear:

> *I don't think we are kind of necessarily forming a long bonding relationship with any particular subcontractor. There are maybe two or three on the books that we do but generally speaking I think that the feeling out there and the feeling I get is that we don't have a loyalty to any particular companies and I don't think we get a loyalty returned because of that. I don't want to overstate the situation, but at the end of the day if we are moving forward from this I think what we need to do is get into bed with a few of these people and start being open and honest about what we are doing. That is what we expect from them and I don't think we are kind of returning that at the moment.*

The belief that, in many situations, both the contractor and subcontractors were failing to cultivate and maintain healthy relationships which led to mutual benefits, was widely held by participants involved in the study. Despite such a situation being relatively commonplace, the same individuals could cite examples where they had witnessed the benefits of such relationships. A senior manager at a subcontracting organisation outlined his views on the importance of long-term healthy relationships:

Most of the site guys know the office guys, the draftsman for example, and they can pick up the phone and say "Peter, this detail is not going to work" and it's about a relationship, it's the benefits of knowing someone. You can generally enjoy working with people or you can have a situation where it is confrontational

The participant's belief that individuals have a choice in how they relate to one another was a significant theme in the data. There was a widespread belief that, although many relationships between main contractors and subcontractors are characterised by a strong confrontational and adversarial nature, there are many examples of positive, mutually beneficial relationships formed by a conscious decision to move away from an adversarial approach. An area director working for the contractor summarises his views on this issue:

We have got staff with varied abilities. We have got some that can have very good relationships and can get subcontractors to jump through hoops. Other members of staff with the same subcontractor are at war and that is a great big problem. We have communication bloody training seminars and everybody understands what is going on in the classroom and it is easy yet they don't see it when they are faced with it and in a lot of instances. If people could get on well with other people even when we have got problems, and we do get problems; if we didn't have problems we would not be here. Everybody under pressure forgets things and it is last minute sometimes and it can't be helped but there are ways and means around it and we tend to go into blame culture and we are not prepared to accept our own problems at times

This quote usefully summarises several key areas relating to relationships: the different relationship skill levels individuals possess, the negative effect time pressures have on relationships and the way individuals often fail to recognise their own faults and those generated by the organisations they work for.

Another important finding which emerged during the study, was the way in which different parties held differing beliefs about the success of a particular project they had been involved in and how fairly they had been treated. For example, where the subcontractor, and contractor had not held a post-project review to discuss, and seek to resolve issues, project participants often held differing views about their own and others performance and behaviour. The triangulated case study methodology allowed this important issue to emerge. By way of example, two different participants, the first a project manager from a major mechanical and electrical subcontracting group, and the second a contracts manager from a contractor, had the following to say about the same aspect of the same project:

> Subcontractor:
>
> *They messed us around on programme and wanted us to mobilise the next day with a full team on the basis of a phone call after they had kept us waiting for two weeks after we were due to start. Now I have the problem of what to do with my lads during that time and then all of a sudden it's "right, we're ready for you and we need to make up some time" and they don't seem to realise the mess it causes*
>
> Contractor:
>
> *We always try and beat the programme, that's one of my personal aims. There are times when we can't help but go behind and then it's up to us and our subbies to do our very best to get back on track and this situation happened on this project actually and our subbies came through for us and supported us 100%*

6.2.1 Healthy Relationships

There was an overriding belief that promoting healthy relationship properties as the key aspect of contractor-centric approaches to SCM, would lead to mutual gains for all parties. The data showed that the factors listed in figure 6.3 below, and explored in greater detail in the following pages, were widely believed to be the most important properties of a healthy relationship:

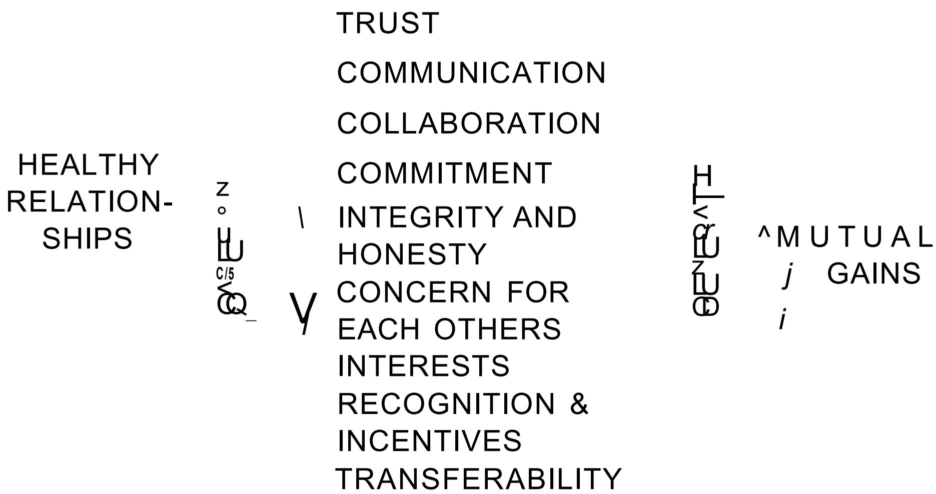

Figure 6.3 Healthy Relationship Properties

6.2.1.1 Trust

Trust was universally considered to be the single most important aspect of a relationship by those involved in the study. It is regarded as a benchmark measure of the health of a relationship, which is difficult and time-consuming to cultivate, yet easy to lose. A senior construction manager includes trust as the foundation of successful relationships cultivated with certain subcontractors on a Design and Build framework he is involved in:

> *What I think is that we have developed in our relationships, collectively with certain subcontractors, is that now we have got to the point where there is a bit of trust built up and what is so strange really is they are actually ringing us and saying "we know we have got flooring to do" for example XX (names a subcontractor) came in to do the flooring, but they were ringing us saying "we know we are due to lay the flooring in about two weeks time when it is due" so all of a sudden they are now looking at their own programmes and know they have got work coming off for us to do and rather than our guys chasing them they are ringing us now and saying that "your flooring is due to start in a week". You only get that through relationship building that you have got with the people that you are dealing with. I am not saying you treat them with gloves; you treat them correctly that is what it all boils down to. You treat them as you want to be treated really. If they go wrong they hold their hands up*

As can be seen, the lack of a debrief and honest exchange of views between these two individuals does not allow each others understanding to be tested and resolutions for future practice agreed.

All parties suffered, to differing degrees, from poor time, cost and quality performance. Whilst there were many positive relationships that had been developed over time, there was a feeling that the majority of relationships were short-term, adversarial and formed on the basis of the lowest price. Perhaps unsurprisingly, the need to cultivate healthy relationships was universally recognised by those involved in the study as a fundamental cornerstone of SCM.

In summary, participants believed that trust means each party working in a way that leads to positive outcomes for the other party, avoiding actions that will lead to negative outcomes, and having a moral commitment to maintaining the relationship.

6.2.1.2 Communication

Communication happens on many different levels. There was a strong and widespread belief that the accuracy, timeliness, adequacy, and credibility of the information generated and exchanged, needed to improve. This finding is similar to that of Briscoe *et al* (2004), who found that communications were a key factor in successful supply chain relationships. Successful project performance was often associated with regular meetings involving the same staff, where attendance was sporadic. This was viewed as having a seriously damaging effect. Regular face-to-face contact, and open disclosure, was seen as an essential aspect of good communication as an owner of a joinery subcontracting organisation points out:

> *We need to keep talking and make sure that we are open with each other. The worst thing that can happen to me is that the guys on site start playing games when they are behind programme, telling me what they think I should hear to keep my labour on standby…just tell me what's happening and I can deal with it and respond much better instead of not being able to plan anything*

The subcontractor talks about the main contractor keeping information to themselves, as they believe they will benefit from such a lack of disclosure. Simatupang and Sridharan (2005), believe private information, between buyer and seller, is one of six factors leading to discontent in SCM, which contributes to a reduction in the total profits available through collaboration. The findings of this study show that information is often treated as private between main contractors and subcontractors and does lead to problems. It is difficult to align inter-organisational objectives, for example between main contractor and subcontractor and subcontractor-subcontractor, where information is withheld.

6.2.1.3 Collaboration

The findings show that working together to reach mutual goals not only averts problems early in the project cycle, and mitigates the risk of conflict, it also introduces real improvements that participants believed would otherwise not have been possible. Those involved in the study were more likely to collaborate where their efforts were recognised and led to rewards being equitably distributed. This finding provides support for the way that the JCT Constructing

Excellence Contract (2006) includes target cost mechanisms as a way to promote collaboration and integrated team working. It would seem that the act of collaborating within an equitable environment leads to those involved enjoying their work. A subcontractor highlights his views:

> *The best projects are the ones where we all get involved and are constantly looking for ways to do things better for everyone rather than just ourselves. If we all work together and share the benefits then not only all our businesses do better, but we actually enjoy the process and that part can't be underestimated*

This finding conflicts with Cox *et al's* (2007) belief that collaboration is the logical response *only* where higher future rewards are envisaged; as the participant points out, collaboration provides personal satisfaction as well as more tangible business benefits. Personal satisfaction was a common issue discussed by participants, with many stating that they believed all parties worked more effectively where personal and business objectives were aligned.

6.2.1.4 Commitment

The willingness to remain focused on mutual goals, exercise additional effort in difficult times, and continue to build on the past, was viewed as central to building and maintaining healthy relationships. Commitment can be considered a stabilising factor, as it avoids the process of forming and dissolving short-term relationships and teams.

The importance of remaining committed over the long-term was a recurring theme in the data. A senior construction manager, working on a long-term framework with subcontractors who had been given an informal 'supply chain partner' status, had the following concerns about subcontractors' ability to remain committed over the long-term:

> *The bit that worries me with supply chains is whether or not that relationship remains for a period of time, they are the new boys on the block at the moment and they want to perform and they have got to keep performing. How we will be three years down the line I am not quite sure whether or not they will get complacent, whether they will give us the same service and we have got to watch and monitor that*

As can be seen, commitment is strongly related to trust; trust relies on individuals doing what they say they will, and their behaviours and actions demonstrating congruence. The participant's concerns about the need to ensure subcontractors working with them over the long-term, provide a consistently good service, opens up an important issue which was repeatedly found in the data. Whilst the intention to form long-term relationships is important, some participants, particularly those with limited experience of SCM, associated it with a requirement to work with the same subcontractors over the long-term, irrespective of the subcontractor's performance. However, such controlled loyalty, and lack of choice, need not be a component of SCM, as it can stifle competition. Those individuals who had experience of SCM were keen to point out that early adopters in construction had often agreed long-term frameworks with supply chain partners, with whom they had poor relationships and which incorporated poorly-developed service performance measures.

When questioned about the reasons for these problems, the participants believed that the early SCM models had been based on manufacturing industries, and as such failed to meet the requirements of the construction industry. A commercial manager had the following experience:

We ended up in a position where we were stuck long-term with these guys and they were'nt working as we wanted them to. Not only that, they were underperforming the market in terms of cost and we were stuck with them because we'd tried to do something we didn't really understand and we were stuck trying to deliver for our clients with half a team

This finding concurs with Green's (1999) view that much SCM fails to take account of the unique requirements of the construction industry, in addition to Fisher and Morledge's call for consideration of context (2002). Similarly, it supports Mouritsen *et al's* (2003) view that those seeking to utilise SCM, by transferring it from other industries, should check the 'fit' between the different industries objective situational factors.

The importance of this finding cannot be underestimated; whilst UK construction best practice discourse clearly supports the view that SCM is a route to improving the industry, the lack of detailed guidance, particularly for contractors, leaves organisations 'cobbling together' their approaches as one participant put it. Similarly, the overriding importance given to meeting client values, as is overwhelmingly stressed in the literature (CIRIA, 1998; Kelly *et al,* 2004), suffers as organisations attempt to 'bolt on' SCM from other industries, without taking account of their own needs, whether organisational or industrial.

The commercial manager quoted above eloquently summarised this position when referring to his experience with another contractor who developed an early approach to SCM:

We tried to do something we didn't really understand and we were stuck trying to deliver for our clients with half a team

6.2.1.5 Integrity and Honesty

The need for relationships to be formed on the basis of integrity and honesty was a prominent theme in the data. Participants often recounted examples where they had worked with individuals who did not act in this way, and these relationships were often short-term and characterised by problems as one subcontractor pointed out:

> *As one of the finishing trades we always get pressured to make up the time that gets eaten up early on. Anyway, on this particular project we were getting close to the end of the project and we were being asked to put more men in on a daywork basis and do all kinds of extras. So, we get stuck in and the QS is making all kinds of promises, keeps saying everything's going to get paid for everything, but he's always too busy to sort the paperwork out. Now, we don't have too many worries as we've worked with this contractor loads of times, the QS is new to us, but like I say we've worked very well with XXfmentions contractor's name) in the past. Now, we all get there, we get the job done and everyone's happy, "thanks John, great job". Then comes the 'but' when we're trying to agree the final account, seems the QS no longer agrees about the dayworks and the variations and expects us to pay for it all, like it's our problem. Now on the basis of how he acted and how nobody else there stood up for us and made sure we got what we were due, we're seriously thinking about not working for them again*

This quote is particularly illuminating as it illustrates the importance of the different locations at which the relationship is held. For example, the subcontractor based his decision making on the basis that he had previously enjoyed a successful relationship with the main contracting organisation. In addition, he had little previous experience of the individual quantity surveyor who now works for the contractor. However, as the quantity surveyor deals with financial issues, this relationship becomes important when agreeing the final account. As the subcontractor believes that the quantity surveyor acted without integrity and honesty, and that this situation could not be reversed by others in the contracting organisation, he considers not working with the contractor again in the future.

This finding links integrity and honesty with the issue of decision authority, where counterproductive decisions stem from differences in decision-making authority (Lee *et al*, 1997). Simatupang and Sridharan (2005) consider it such a significant issue that they incorporate it in their six-level typology of issues causing supply chain discontent. Whilst the subcontractor, quoted previously, had suffered from a lack of integrity and honesty, many subcontractors were keen to praise the contractor's staff for the way in which they conducted business. Similarly, many of the contractor's staff were keen to point out examples where subcontractors' positive behaviours helped to deliver projects in testing environments.

6.2.1.6 Concern for Each others Interests

The belief that healthy relationships rely on each party having a concern for each others interests, was believed to be particularly important by the participants involved in the case study. The findings suggest that whilst participants were keen to state their adherence to this maxim, they felt that many of the people they worked with often overlooked this factor and focused solely on their own needs; whether organisational or personal. A commercial manager outlines his views on the matter:

The biggest single aspect which affects how well we work with our subbies is whether we actually care about what happens to each other. There are some subbies I know will do everything they can to help us succeed and there are others who, although they might talk a good game, when it comes down to it they don't care as long as they are doing ok. Now that works both ways, I know that there are times when cashflow is massively important to my subbies and if it's going to help them out I'll pay them early and that genuine concern I have for them will help them out and it will come back to me tenfold, people have long memories of both the good and the bad

As can be seen, having a concern for each others interests is viewed as an investment in the relationship which will bring dividends over the long-term, something which is important as 'people have long memories' as one participant stressed.

6.2.1.7 Recognition and Incentives

The contractor's staff were keen to point out that, although they often informally recognise the performance of their subcontractors, and as a result develop trading relationships, they fail to capitalise on these relationships and generate additional benefits for both parties. Notwithstanding the different strengths of relationship that exist between the contractor and their subcontractors, the contractor failed to offer specific rewards, or a differential, in terms of status or trading terms. This was one area where the contractor's staff believed their approach needed changing as they felt it was ineffective in securing maximum advantage from their relationships. An operations director from the contractor made the following comment:

It seems to me we're missing a trick because if you look at our database our subbies are either approved or not approved and that's the only criteria we have, well that and their performance scores, but the point I'm making is that we work with lots of the same subbies again and again *very successfully, but there's no way of either formally recognising that relationship or giving them some kind of preferential treatment for their efforts over the years and that just seems wrong to me*

Similarly, a director of a glazing subcontractor raised a common issue by focusing on the importance of recognition and equitable incentives:

> *Recognition is important to us, we all want thanking when we do a good job, it's a human need as far as I'm concerned. We make good money in this industry and after a certain level of income other things become important like enjoying what you do and being recognised for a job well done. If we get recognised then we are more likely to get involved and help make sure that we all win, but if our hard work never gets a thank you and we never get any recognition, then it takes the edge off it forme. In the same way we like to know that we will share in the benefits, we've had projects in the past where the contractor is doing very well, yet they've told their QS's to squeeze us and that's wrong just plain wrong*

By stressing the importance of recognition, the participant underlines how important this factor is in developing healthy relationships. Similarly, economic incentives are deemed important not just in their own right, but from the viewpoint of an equitable sharing of the available rewards. Whilst the importance of economic incentives has been identified previously by Lee *et al* (1997), their research focused on the outcome of misaligned incentives, rather than on how closely they are bound together with relationships. Lee *et al* (1997) found that the misalignment of incentives, where one party benefits more than the other, increases the probability that individuals will act in such a way that deviates from the agreed communal goal, as it serves their own purposes better. Such a deviation from the agreed communal goal has serious implications for construction projects. The problems which stem from a lack of recognition and poorly aligned incentives, such as selfish decision-making and a lack of effort, represent a serious threat to the realisation of the client's value system. Once more, this finding reinforces the importance of individual efforts in developing contractor-centric SCM.

Recognition was similarly deemed important at a more formal non-project specific level. The binary approved, or unapproved, status which differentiates subcontractors on the contractor's internal subcontractor database, was criticised both by the contractor's staff and subcontractors. The criticism rests on the way that it fails to reflect the performance and strength of relationship which exists between the two parties. A subcontractor outlines his views on the issue:

> *We've been working together now for around six years and I think I'm right to say that they are pleased with what we do, certainly that's what I get told, so you could say that we have a special relationship. The thing is that it's not recognised anywhere, so they know if they come to us they get our best price, we pull the stops out to get the price back on time and we always make sure we deliver, but as far as I'm aware we don't get recognised for the service we give them in any way, certainly we often find that someone cheaper gets the job and then they end up costing more in the long-run*

Interestingly, many of the contractor's staff believed they needed to be more discerning in the way they recognise and formally treat subcontractors. Instead of treating all subcontractors the same, irrespective of their performance and strength of relationship, there was a strong feeling, from both subcontractors and the contractor's staff, that they should both positively discriminate in favour of those organisations which consistently support their businesses. It was believed this would help ensure all parties remain committed to the overall goal of meeting the client's value system.

6.2.1.8 Transferability

Transferable teams, where the team who works on one project, is transferred to another project, to benefit from the relationships and ways of working together that have developed, were something that the contracting organisation struggled to maintain for its own staff. The difficulty that contractors face striving for continuity has previously been recognised by Ireland (2004). Holti *et al's* work on Building Down Barriers (BDB), stressed the need to integrate the supply chain by ensuring the team was kept together from project to project (2000). By focusing on main contractor-subcontractor relationships, this research found that this principle was effectively practiced by some subcontractors with whom the main contractor had a strong, healthy relationship.

It would seem that whilst contractors often find it difficult to maintain the same team and transfer them from project to project in non-framework situations, they are more successful in providing transferability for their subcontractors in these scenarios. Contractors are able to provide this transferability as they effectively smooth demand and develop continuity for subcontractors' services by working for a number of clients. This finding supports the claims made earlier in the thesis supporting contractor-centric SCM. Such transferability does, however, require a proactive approach based on open communication and information sharing between both parties.

Subcontractors' teams, who were transferred by request, were commonly called 'A' teams as they were deemed to be the subcontractor's most successful and highly-performing teams. In situations where every project has a new group of subcontractors, there is a learning period where both contractor and subcontractors learn about, and deal with, each others strengths and weaknesses. A subcontractor had the following to say:

> *The problem is that we all work together, go through the trials and tribulations of a new relationship where we all work out what each other needs and then it all gets thrown away as they pick someone else next time and there have been plenty of items recently where I've said "why don't you tell us what you've got coming up and we'll try and plan it with you". We all know it's hard to get continuity, but you'd be surprised what can happen by talking to each other and planning things*

Taking account of the benefits of keeping the wider supply chain team in place, many participants were keen to ensure that any approach to SCM should aim to protect these teams and move them between projects. Keeping high performing teams together benefits the transfer, and ultimate realisation, of the client's value system as one of the contractor's project managers affirms:

> *Where we are all working together again and again it means we've learnt each others strong points and hopefully ironed out some of the weak points and this really tells because we work better from an early stage and make sure we pull all the stops out to delight our clients*

6.2.1.9 Summary

Relationships are the medium through which individual behaviours, whether positively impacting or negatively impacting on project success, are enacted. The findings suggest that any approach to SCM must incorporate policy and procedures based around the generation and maintenance of healthy relationships. For example, approaches to SCM which fail to recognise individual efforts, will fail to encourage the commitment and collaboration required from individuals to work effectively at tender stage in Design and Build projects and meet the client's value system. Similarly, approaches to SCM which fail to recognise the strength of a relationship between two organisations, and reward it with tangible benefits, will fail to harness maximum advantage, a theme which repeatedly emerged in the data.

As with recognition, contractor's approaches to SCM must incorporate trust, communication, collaboration, commitment, integrity and honesty, a concern for each others interests and transferability. Trust was found to be perhaps the most important relationship property in any approach to SCM. The evidence suggests that cultivating, and continuing to build trust, must form the centrepiece of any contractor-centric approach to SCM. Any approach which fails to incorporate policies and procedures which seek to promote positive relationship properties, will effectively incorporate structural weaknesses. In turn, by recognising the central role that the wider supply chain plays in meeting the clients' value system, a failure to include a relationship focus will make it difficult to address the tendering issues raised in the next section of this chapter.

6.3 Tendering

6.3.1. Poor Tender Returns & Secondary 'Sendouts'

Despite recognising that gaining subcontractors' early involvement in scheme development can lead to increased competitiveness, and risk reduction for all involved, many participants believed that they failed to develop relationships and systems that routinely guarantee this input. A senior member of the contractors estimating staff had this to say:

> *The problem is we simply don't get the support at tender stage, we get so few returns that you often get the situation now where we haven't got a price from the market for a package of works, so we are committing ourselves to thousands of pounds of work without actually knowing if we can build it for that*

The problem of not receiving tender returns from subcontractors at tender stage was widespread and was deemed particularly problematic as it drastically increases contractors' risk profiles and reduces their competitiveness. Further exploration of the reasons behind this problem led to the emergence of a particularly interesting aspect of the contractor's subcontract procurement practice; secondary 'sendouts', which are not recognised by literature in the field. Secondary sendouts describe a situation where the contractor typically carries out two rounds of tendering as follows:

1. Main contract tender stage - in order to get subcontractors to price a specified package of works, thereby enabling the contractor to build up their overall tender price prior to submitting this to the client.
2. Following the main contract being secured - to reduce costs, often including subcontractors who did not price at the main contract tender stage.

Subcontractors interviewed stated that they were increasingly refusing to accept the contractor's request to avoid pricing the package of works at main contract stage, as where they had done so in the past, they later found out that another subcontractor had been awarded the works following a second round of tendering. A contractor's quantity surveyor gives a typical explanation of this practice:

> *What we do is after we've won the job we get all the info off our estimators, you know who's priced what and what prices we have got and what they've included. Now my job as I see it is to make as much money as I can, so what I do is get a package together and send it out to beat the price we have already got*

When asked whether the subcontract packages are sent to the same subcontractors used by the contractor's staff involved at the main-contract stage, the quantity surveyor replied:

> *Sometimes yes, sometimes no, to be honest I know who's going to give me the best price and a lot of the time I don't have that much to do with the subbies (subcontractors) our estimators use so I'll go to who I know I can talk to and get the right price from*

The data shows that this situation, where the contractor's quantity surveyor is choosing to repackage the works following the main contract being secured in order to reduce cost, is widespread. It should be noted that in some instances the package of works as tendered, following the main-contract tender stage, has changed from the design and specification as incorporated in the package as tendered at main-contract tender stage owing to value engineering, design development, and in some instances client-led, changes. Nevertheless, the inefficiency of what is effectively two tender processes is compounded by the fact that many subcontractors are aware of this practice, and hence are unwilling to price at tender stage. A steelwork subcontractor had the following to say:

It's just not worth my time and effort pricing their work, what you've got to realise is that our estimating service is a massive overhead that's got to be paid for by the work we carry out, now I'm going to try and maximise our strike rate so why should I put all that effort in to provide a pricing service when the QS (quantity surveyor) is just going to screw it up and throw it away before giving it to his mate without talking to me?

This comment is particularly illuminating as it shows how futile the subcontractor regards pricing at main-contract tender stage, thereby reducing the ability of the contractor's tender to reflect the client's value system as articulated in the tender documents. Similarly, the data suggests that many believe the view that subcontractors who price at tender stage are simply being used as a pricing service, without any real opportunity of actually winning the work, has led to the problem of the contractor receiving few prices at tender stage.

Secondary sendouts not only lead to a reduced number of prices being received at tender stage, they also reduce the subcontractor's propensity to value engineer, which is such a vital way of adding value (CIB, 1996; Kelly and Male, 2004). As explored in chapter five of this thesis, alternatives offered by main contractors are a highly effective way of adding value. This type of value addition is particularly important considering the way in which it can realign developed Design and Build with its original maxim of contractor design. The contractor's ability to offer alternatives is often fuelled by their subcontractors, who often offer alternatives in their tender submission to the main contractor. However, this research has found that secondary sendouts constrain the subcontractor's propensity to get fully involved from an early stage, as their work is likely to be used to help generate a second round of tendering where the main contractor is successful in securing the main contract. In this way, secondary sendouts limit the way the supply chain can add value to the project which has a detrimental effect on maximising overall client value.

Secondary sendouts represent a novel and previously unreported finding which has real implications for the effective transfer of client value at tender stage; particularly in Design and Build tendering. By introducing two rounds of tendering, secondary sendouts increase the inefficiency of the tender process. Whilst UK construction best practice literature has repeatedly called for increased efficiency in the tender process, (Action on Banwell, 1967; Latham, 1994), it has failed to address widespread inefficiency at the main contractor-subcontractor level of the supply chain.

When one considers the multitude of main contractor-subcontractor tender processes which take place for every client-main contractor tender process, the scale of the inefficiency is all too apparent. As explained in this thesis, selective tendering was introduced to reduce tender inefficiency and increase quality by prequalifying organisations based on their performance potential prior to being allowed to tender (see, for example, NJCC, 1996a, 1996b). However, this cornerstone of best practice advice has solely focused on the client-main contractor tender processes. The practice of secondary sendouts, which this research has uncovered operating at the main contractor-subcontractor level in the supply chain, represents a significant lack of adherence to the principle of selectivity. The multitude of main contractor-subcontractor tender processes compounds this problem. Of particular importance to this thesis is the way that secondary sendouts introduce additional parties into the tender process, a key value switch point, thereby reducing the ability to transfer client value between the different parties in the supply chain. The subcontractors who are involved in secondary sendouts, and indeed many of the contractor's staff, recognise the problems they create.

If one were to consider secondary sendouts being practiced at the level of the client-main contractor tender process, it would highlight how inefficient they would make the tender process. At this level of the supply chain, it would mean that the client would start by prequalifying contractors before selecting a tender list to price the works. Following the different contractors developing and submitting their tenders, another department within the client's organisation would re-tender the works to another list of contractors with the aim of reducing the price. Clearly, the greater control of the tender process exerted at a client-main contractor level, allied to the certainty that additional contractors will not be introduced on an informal basis to reduce costs, ensures better tender returns and removes the issue of secondary sendouts at this level in the supply chain.

6.3.2 Subcontractor Intellectual Property Rights

A significant theme uncovered in the data, relating to trust, was the breach of subcontractors Intellectual Property Rights (IPR) by contractors seeking to secure competitive advantage at tender stage. Subcontractors who carried out a design function as part of their service, complained that they had suffered in situations where their designs and ideas had been passed around by the contractor to other subcontractors tendering for the same works, in order to reduce costs and 'level the playing field'. A director of a large mechanical and electrical subcontractor made the following comment at a subcontract seminar, held to gain an insight into the subcontractor's opinions:

> *What really pisses me off is when we put a lot of work in on early designs, you know effectively developing the scheme because we are the ones who know the best way to actually make it work and strip out all the unnecessary cost out, and then we find out that the contractor has taken the work we've done and hawks it around the bloody marketplace to these other subbies getting them to price on the same basis...that is not right because I'm being used as a specialist design and specification service for free when I don't get an order, and it destroys any trust we have and that's what I've come to say today…you do this to me and you think it's alright, well it's not and I ain't working with you again until I know it won't happen*

The strength of feeling is easy to decipher from the participant's comments. The contractor's staff did not deny that this practice occurred, however they seemed unaware of its negative and damaging effect on the relationship until it was pointed out to them.

6.3.3 Unsolicited Tenders

Another tendering-based issue, which emerged as particularly important and is not recognised in construction research, is that of unsolicited tenders. As the name suggests, unsolicited tenders, also sometimes called 'poach quotes'; are tenders which subcontractors send to main contractors without being solicited to do so. Unsolicited tenders are received at the following two stages:

1. Pre-main contractor tender submission - the data suggests that these tenders represent the most significant problem for contractors as they are aware that the unsolicited price is 'in the market'. As such, if the unsolicited price appears commercially superior to the tenders received

from their selected subcontractors solicited to support them at tender stage, the contractor is aware that, if they choose not to use the unsolicited tender, it may make them uncompetitive.

2. Post-main contractor being awarded the contract - this type of unsolicited tender is deemed to be less of a problem as the contractor's decision, whether to use the tender, is informed more by making additional profit, and not from a fear of being uncompetitive in the marketplace.

Where tenders are submitted close to the main contractor's final tender submission, they are intended to tempt contractors to accept them by incorporating a lower than average price. An estimator working in the contracting organisation had the following to say:

> *The trouble is they always land last minute and it's difficult to say no when they are £50,000 lower than the best price you've got...you see we know then that the lower price is out in the market and if we don't use it someone else will and when it's a lot lower that's probably going to strike us out of the race in one go...so you can't ignore them*

In situations such as the one described above by the contractor's estimator, contractors are often unable to carry out anything other than a superficial evaluation of the unsolicited tender. As such, these tenders increase the contractor's risk profile where they choose to incorporate them in their tender submissions to the client. The same estimator continued:

> *Certainly we don't get the chance to check them out as much as we would like, especially on M&E (mechanical and electrical) where there's*

so much to go through, so a lot of the time we have to make as many checks as we can and then put our tackle on the line

However, other members of staff in the contracting organisation, particularly operations staff whose job it is to deliver the projects on site, often felt differently. In contrast to preconstruction staff, whose priority is winning work and as such are often keen to promote the use of unsolicited tenders, operations staff interviewed as part of this research often felt that they represented too great a risk. They argued that whilst unsolicited tenders often carry a temptingly low tender price, this often grows during the project cycle until it bears little relationship to the temptingly low tender price.

As shown in chapter five of this thesis, cost certainty is considered to be such a fundamental concern for clients, that it is one of the key risk factors driving the choice of developed forms of Design and Build. However, it would seem that whilst there is a recognition in the contracting organisation that unsolicited tenders are associated with cost inflation during the project cycle, they are still used. This is an interesting finding, as in Design and Build projects, contractors are left to bear the cost of any price increases which take place outside the contractual boundaries of recoverable variations. Nevertheless, some of the contractor's staff were clear on their condemnation of the use of unsolicited tenders as a project manager strongly reinforces:

> *One of the things that causes us problems are the unsolicited bids, the rogue quotes, we get blinded by a price that's lower than the rest and sometimes we don't even know the subbie (subcontractor), but we go for it with them because they are cheap and then by the time we've finished and agreed the final account it looks nothing like the figure that landed on our desk in the first place*

Where unsolicited tenders are received following the contractor successfully securing the main contract, they are received from subcontractors who originally submitted these tenders to contractors who were unsuccessful in securing the main contract. In this way, the subcontractors are trying to utilise the work they have already carried out rather than waste it. A subcontractor outlines his views on this matter:

> I/\/e *know who's won, so we'll send them our tender to see if it's of interest to them, there's no harm in doing that, we aren't breaking any loyalties because there's none to break. We win quite a bit of work that way*

As can be seen, this participant's loyalties to one particular contractor are redundant once that contractor is unsuccessful in securing the main contract. Loyalty emerged as an important issue during the research and attempts are often made to formalise it at tender stage. The contractor and subcontractors often agree exclusivity agreements, whether formal or informal, that they will only price or request prices from certain parties. As with secondary sendouts, considering the issue of unsolicited tenders at the level of the client-main contractor tender process, underlines the differences between client-main contractor and main contractor-subcontractor tender processes. As has been shown in chapter five of this thesis, selective tendering, in various forms, is popular in UK construction (NJCC, 1996a).

Selective tendering incorporates a process of prequalification resulting in a defined list of organisations selected to tender for the works (NJCC, 1995; 1996a; 1996b; JCT *Practice Note Six,* 2002). Selective tendering incorporates widely understood key processes, encouraging those organisations who tender to become fully competitively involved, as they know that competition is limited to a generally predefined number of organisations. Perhaps unsurprisingly, unsolicited tenders were not being used at the client-main contractor level. When questioned on this issue, a director of the contractor had the following to say:

> I/I/e *wouldn't get involved with clients who did that, no way, itjust wouldn't happen*

However, this research found that unsolicited tenders at the main contractor-subcontractor level of the supply chain, were found to be relatively common place and do have serious implications for the transfer of client value. Considering unsolicited tenders, in terms of the way they are associated with cost increases, shows how they impact on the ability to meet the client's value system. As stated, where costs do increase under a Design and Build contract, with the exception of recoverable variations, the contractor is left to carry any cost increase and this exerts pressure on their ability to deliver the scheme within the defined value parameters.

6.3.4 Lack of Consolidated Expenditure

Data analysed as part of the study shows that the contractor traded with 2,831 subcontractors in 2005. This lack of consolidated expenditure was believed by some participants to lead to various problems. The difficulty in setting and consistently achieving common standards is underlined when one considers that in 2005, 181 quantity surveyors working from 25 offices, placed 7,195 orders, which were not unified using a SCM-led strategy across the business.

This effectively represents 181 separate construction-phase supply chains in addition to other pre-construction supply chains. This lack of consolidation was believed to contribute to a lack of support at tender stage, inconsistent performance and particularly poor quality work, by many of those involved in the study. Such poor quality often leads to defect liability problems causing needless re-work, administration and loss of client confidence. A project manager had the following to say:

> *We wonder why we keep having problems and all the time we work with new people instead of trying to keep working with the same guys again and again and trying to kick the bar as high as we can together...that's not entirely fair I suppose...we do work with a lot of the same subbies (subcontractors) but when you look at the figures and consider some of the problems we have, the case for consolidation looks pretty watertight*

The case for consolidation does not just rest on the way that working with the same subcontractors, on a repeat basis, can help increase performance through the way each party becomes accustomed to the others way of working. Another major benefit is the ability to develop volume rebate arrangements. In this way, consolidation can help align different organisations' business objectives; a factor which is regarded as a fundamental aspect of effective SCM (Simatupang and Sridharan, 2005). Volume rebate arrangements were found to be held between the contractor and material suppliers to reward the contractor for purchasing generally predefined volumes of products or services. The rewards are received in the form of rebates, generally taking the form of sums of money, paid back to the buyer at a predetermined point in time, relating to a specified trading period. Whilst such agreements were found to be in place between the contractor and a number of suppliers, there was a feeling that the significant benefits available were not being maximised. In order to prove effective, volume arrangements rely on consolidation of the supply chain, as one participant points out:

> *When it comes to rebates we need to make sure that we are placing work with the same guys again and again to make sure we get that rebate as high as possible.*

The same participant later continued:

> *We do it with suppliers now, but we are surely missing out by not working more with the same subbies and doing it with them because that's where we spend the real money*

In this way, consolidation can help increase the ability to focus potentially disparate organisations, and individuals, on meeting the client's value system.

6.3.5 Inefficient Subcontract Order Processing

The wide range of variation in order values is accompanied by time-consuming administration as one participant, a quantity surveyor who administers the order placement process, comments:

> *I spend half my time stuck in the cabin dealing with paperwork, whether its getting the packages ready to go out, or setting up the actual orders including the contracts, I know someone has got to do it, but it takes time, so much time up and it stops me doing my job*

In this way, the quantity surveyor's primary responsibility of generating value is being significantly diluted, not only by the process of developing enquiries, requesting and evaluating tenders, but also by the burden of administering orders. Chapter five of this thesis showed how time pressures impact on tender evaluation during the client-main contractor tender process. For example, by reducing the consideration of alternatives, time pressures impact on the supply chain's ability to add value. The data suggests that the contractor's internal company procedures are exerting time pressures which may similarly impact on the ability to take account of the subcontractor's ability to add value.

Processing orders, in such a way that contractors and their supply chain enter into rigorous and robust contracts, is a task which was often found to be time consuming and poorly executed. Many participants believed the problem was exacerbated by the significant volume of low value orders being processed. A director of the contracting organisation makes his views clear on the issue:

> *We've got our quantity surveyors spending their time messing about with low value orders like mastic and bloody cleaning and let me tell you these QS's (quantity surveyors) are expensive beasts to keep*

Each order is generally placed following a process that involves the receipt of numerous quotations from various subcontractors. Conservatively, an average of four quotations are generally requested at both pre-contract and post-contract stage, equating to approximately 58,000 quotations in 2005 alone. The costs associated with these processes are significant. The data shows that this significant use of resources, by the contractor and numerous subcontractors, inevitably leads to additional costs being incurred by all parties.
The subcontractor database contains details of over 30,000 subcontractors; approximately 2,500 of which are approved. The average subcontract order value, from 2003 to 2005, was approximately £28,000 over a range of individual orders from £5 to £2,500,000.

The 181 quantity surveyors, who placed 7,195 orders with 2,831 different subcontractors in 2005, used 11 different subcontract agreements amounting to a total value of over £236 million. The various order value bands from 2005 are shown below in table 6.1 and figure 6.4, highlighting the diversity of orders. Orders ranging from £0 to £10,000 constitute almost 4,300 orders; the largest proportion. As such, 60 percent of orders placed have a value of less than £10,000, and represent less than six percent of the total value of orders. Of these, almost 1,400 orders, or 20 percent of all 2005 orders, are created for subcontracted work with a value of less than £1,000, constituting a mere 0.3 percent of the total value of orders.

Order Value	Total Orders	% of Total nr.	Total £	% of Total £
£0-1 k	1,385	19.3%	702,595	30.0%
£1-£10k	2,914	40.5%	12,521,583	5.3%
£10-50k	1,868	26.0%	43,984,025	18.6%
£50-100k	492	6.8%	35,217,579	14.9%
£100-200k	293	4.1%	41,113,416	17.4%
£200-300k	107	1.5%	26,596,599	11.2%
£300-500k	69	1.0%	26,290,416	11.1%
£500-750k	36	50.0%	21,605,970	9.1%
£750k+	25	30.0%	28,439,547	12.0%
Total Order Value			236,471,730	
Total nr. Of Orders	7,189			

Table 6.1 2005 Subcontract Order Value bands

Figure 6.4 2005 Subcontract Order Value bands

In 2005, the contractor placed £198 million of orders which included the supply of materials. Such huge expenditure offers the contractor the ability to achieve bulk purchase discounts and other benefits, and indeed a number of such agreements were already in place. However, some participants believed that what they regarded as their fractured expenditure patterns meant that whilst the subcontractors realised the benefits for themselves, the contractor failed to capitalise on the opportunities and share benefits. A member of the procurement team outlined his views:

> *The figures speak for themselves, millions of pounds of expenditure on subbies (subcontractor) and we know that a high proportion of that is labour plant and materials and we know that on trades like M&E a high proportion of that is the materials element and we aren't really doing anything about it…the subby (subcontractor) gets all the benefit and that's where they're making their money*

There was an overriding belief that the contractor needs to go further than simply stopping subcontractor cost growth and instead work with their subcontractors to reduce costs, whilst protecting and indeed increasing value. This is a fundamental point if one accepts that contractors have a role to play in developing their own approaches to SCM which are able to increase the effectiveness of Design and Build tendering and provide benefit for themselves, the client, and the subcontractors which work with them. As explained in an earlier chapter of this thesis, few clients have the appropriate demand profile to develop their own approaches to SCM (Cox *et al,* 2007). Taking account of the way that contractors have the potential to combine demand from various clients, they stand well placed to develop their own approaches to SCM. However, this ability to pioneer their own approaches stands in sharp contrast to current practice.

This finding is incredibly important as it highlights how different subcontract packages, with different values, scopes of work and ultimately differing impacts on client value, require essentially the same amount of time and effort from the contractor's staff. Instead of developing frameworks to radically simplify low-value orders, as was often suggested by participants involved in the study, the contractor continued to fail to differentiate between the types and values of order. Once more, the literature does not identify this issue as it focuses so myopically on the client-main contractor tender process.

The volume of unconsolidated orders being created throughout the contractor's business stands in sharp contrast to the relatively evenly distributed order values of key trades. In 2005, the top 20 trades by order value accounted for over 92% of total subcontractor orders placed, at around £218 million, as shown in figure 6.3. Indeed, an overwhelming 90% of the 2005 top 20 trades are included in the 2004 top 20. Despite such opportunities for consolidation, the contractor's senior staff felt frustrated by an inability to 'join up the dots' to use the words of one senior director. The high correlation between the top trades, by expenditure, usefully identifies the trades with the most fundamental impact on project success. Many of the trades included in the 2005 top 20 have a design input requirement from subcontractors and as such these subcontractors have the ability to add value to projects. In addition, they arguably represent being the most significant parties transferring client value through the supply chain. However, the contractor's lack of a targeted approach to working more effectively with these organisations, in a SCM framework, reduces the ability to be transmit, transform and maintain the client's value thread (Bell, 1994) through the Design and Build tender process.

Figure 6.3 2005 Top 20 Subcontract Tades by Expenditure

6.3.6 Simple Selection Criteria

In 2005, over £236 million of subcontract expenditure was channelled through the main contractor's relatively simple selection criteria. For example, the selection criteria consists of a yes, or no, binary subcontractor database approval process (itself based mainly on statutory health and safety criteria). This is generally followed by a possible review of the subcontractor's performance and a simple identification of the lowest quotation cost. A contracts manager made the following comment:

> *We still tend to go with the cheapest and irrespective of whether they have performed brilliantly or not we do seem to be choosing subcontractors over and over again based on the fact that they are cheap*

This is an extremely important point when one takes account of the importance given to value-based selection processes, as explained in earlier parts of the thesis (Latham, 1994; CIRIA, 1998). This finding shows that irrespective of the value-orientated evaluative processes taking place at the client-main contractor tender switch point in Design and Build projects, client value can be compromised where these approaches are not utilised at different points in the construction supply chain. The overriding focus of UK construction research on client-main contractor tender processes has failed to take account of such damaging practices which take place on a much larger scale at the main contractor-subcontractor level. Such a focus is misplaced when one considers the numerous value switch points, which take place for every single client-main contractor tender.

Procuring hundreds of millions of pounds worth of goods and services on the basis of the lowest tender cost, across a range of risk profiles, with little consideration given to overall value or the cost of the final account, is one area that many participants believed needed to change. However, whilst many agreed that more value orientated selection criteria would realise overall benefits, there were still serious concerns that a move to this approach would make the contractor uncompetitive as in the marketplace, as a senior project manager working for the contractor clarifies:

> *If we tied every detail up and took everything into account then our tender price would ride that high that we wouldn't get any work; simple as that. A lot of the time we have to get close to the bone just to get the work in the 1st place, maybe on some of the bigger projects we do, we can take a different approach, but on so much of what we do, it's that competitive that we need the lowest tender cost we can get*

However, this statement masks a different problem associated with low tenders by those involved in the study; the low tender price often substantially increases during the term of the contract leading to highly inflated final accounts. Whilst the movement to selective tendering has developed into more value-orientated approaches in client-main contractor tendering, it would seem that main contractor-subcontractor approaches still suffer from many of the problems which have been targeted for so many years at the client-main contractor level (Simon, 1944; OGC, 1997). A director from the contracting organisation, who cited specific examples, had the following to say:

> *We see it all the time, the subbie (subcontractor) who bids us low and then once they are in with us they play games to get their final account as high as they can. Now where does this all come out? It comes out in the CVR (Cost value reconciliation) and it's there in black and white, tender price of X and final account of X + £20,000 that sort of thing. Now*

if our QS's (quantity surveyors) were a bit more concerned about what they've included, and what they've not included, they would probably go with the tender that was a bit more expensive up front but wasn't masking any nasty surprises and I'm always trying to teach my guys that we need to go that way

The cost-value reconciliation (CVR) is an exercise that is carried out on a monthly basis by the contractor to reconcile the value that is being generated by the work they carry out for the client, against the cost of carrying out the work. A high percentage of this cost is related to the subcontract works. Whilst the CVR provides details of the original cost of the subcontract package (the entry cost), compared to final account cost of the package (the exit cost), the contractor did not consistently analyse the variance between these often divergent figures. This effectively means that subcontractor procurement does not routinely analyse, and consider the relationship between, the price received at tender stage and the final account, despite the contractor's staff recognising the often detrimental effect on their profits.

6.3.7 Client-Subcontractor Tender Coalitions

Another interesting theme, which emerged during the study, was the way in which some clients, experienced repeat procurers, are choosing to contract direct with subcontractors with a design input and failing to include main contractors. Clients are taking this approach as they recognise that much specialist knowledge now resides within the subcontracting organisations. A senior procurement professional working for a developer client made the following comment:

> *We realised that we can go straight to the specialist and work with them; so why not? We know what we are doing and we can have that dialogue very early on and get a real feel for costs. We don't feel that we need the contractor involved all the time; we'll get them involved later when we need to*

This finding chimes with the increasing importance given to specialism (Atkins, 1993; Egan, 1998). The significant aspect of this finding is that this early dialogue is taking place without the main contractor being involved. However, contractors were keen to state that in situations where they had been sidelined from this early dialogue, it had led to problems. The problems included increased risk profiles for main contractors, owing to the client's failure to project manage the input of the differing subcontractors, (particularly in respect of matching material orders to the start on site date). In addition, it was believed it led to complications when trying to eventually agree the Design and Build form of contract.

6.3.8 Time Constraints

As explained in chapter five of this thesis, when discussing client-main contractor tendering, time constraints lead to developed Design and Build being used, as it allows condensed working periods on site. Time was also considered an important factor affecting the ability to evaluate of contractor's alternatives. Both of these time factors place stresses on the relationship between the client, main contractor and the client's consultants carrying out the tender evaluation. As with the client-main contractor tender process, the contractor and subcontractors were found to experience time pressures at tender stage as highlighted by an estimator working for a cladding subcontractor:

We never get enough time, we get the information late from the contractor and then were supposed to understand everything and put our tender together and it causes us real problems actually getting the bid together and getting it back. A lot of the time we don't understand the work in the way we would like, so we are taking on board risks as well that we often don't really understand

This finding, which affects various tender processes at different levels in the supply chain, shows how time constraints impact on the ability to understand the project as encapsulated in the various tender documents. In this way, time constraints have an important impact on the ability to transfer value at main contractor-subcontractor tender stage; one of the most fundamental value switch points.

The respondent went on to articulate another common theme in the data by linking time pressures to the subcontractor's ability to innovate and value engineer at tender stage; less time means less ability to challenge the scheme and add value to the process. Once more, this finding shares many similarities with client-main contractor tendering. As shown in chapter five of this thesis, time constraints mean that contractors are often unable to challenge the client's scheme and value engineer as they would ideally like. Where they are able to develop alternatives, they are often unable to develop anything other than a cursory list of potential alternatives. This shows how time constraints not only limit the subcontractors' ability to understand the scheme at tender stage, which has serious implications for the transference of the client value system, but also on their ability to add value through innovation and value engineering. It would seem that the way Design and Build is recognised for its time benefits (Bennett *et al,* 1996), is leading to increasingly short tender periods. Such short tender periods inhibit effective tender processes, at all levels of the supply chain, which are required to enable client value to be transferred and indeed increased.

6.3.9 Shared Culture

Whilst this research concurs with the findings of Green (1999), that 'culture change' is not the singular requirement for effective SCM, culture did repeatedly emerge in the data as a very significant theme. Culture forms the way in which organisations align their objectives, and in this way, this research concurs with Simatupang and Sridharan (2005); supply chain problems occur where organisational and personal objectives are misaligned. Individuals and organisations focusing on their own goals, at the expense of the collective goal, (realising the client's value system), can be considered as a type of fragmentation, which has long been believed to be one of the most fundamental problems in the industry (Wood, 1975; Atkins, 1993; Latham, 1994). The findings of this research show that the need for the main contractor, and their subcontractors, to share unified objectives, which are underpinned by mutual benefits, was deemed to be the most important factor in developing a SCM culture. This finding develops the general message to replace fragmentation with integration, which has been so dominant in UK construction best practice discourse over the course of the last 50 years, and places it at the heart of contractor-centric SCM.

Previous research (Dainty *et al,* 2001), has shown that subcontractors are sceptical and mistrusting of the mutuality of benefits available from supply chain relationships. This research found similar mistrust in some subcontractors, yet also uncovered many examples where subcontractors were keen to promote the benefits that they had witnessed as a benefit of SCM. Further, the findings suggest that where the contractor promotes the benefits available from SCM, and these are verified by subcontractors who had benefitted in this way, this helped reduce scepticism and mistrust generally.

6.4 Summary

This chapter has presented the findings of the case study focusing on main contractor-subcontractor tender issues in Design and Build tendering and contractor-centric SCM. This research has found that seeking to increase the effectiveness of Design and Build tendering by solely focusing on the client-main contractor tender transition point, or switch point, is not sufficient. Focusing myopically on the client and main contractor tender process, fails to take account of the need to transition the client's value system through the wider supply chain; a key determinant of project success (Standing, 2001). Viewing the project process as a value chain (Kelly and Male, 1992), where value is passed at numerous different switch points, draws attention to the numerous tender processes which take place throughout the supply chain.

The majority of UK construction best-practice research has focused on the client-main contractor tender process and overlooked the myriad of different tender processes which take place throughout the wider supply chain. Subcontractors can perhaps be considered the most important members of the main contractor's supply chain, and they often take an active role in design and specification development in Design and Build projects. SCM has been proposed as a way to increase the effectiveness of UK construction in various ways, including perhaps most important of all, by *integrating* the supply chain. In this way, it shares common ground with the original integrative maxim of Design and Build procurement.

Whilst SCM is clearly advocated in UK construction, it has been argued that it requires the client to take the role of protagonist (Egan, 1998; Briscoe *et al,* 2004). At the same time, it has been argued by Cox *et* al, (2007) that there are few clients with the appropriate demand profile to successfully adopt this role. Contractor-centric SCM offers contractors the ability to gain competitive advantage, and provide benefits to numerous parties, including clients and their supply chain of subcontractors and suppliers.

In order to increase the effectiveness of Design and Build tendering, and ensure contractor-centric SCM takes account of the issues involved in the main contractor-subcontractor tender process, this case study focused on this level of tendering. These findings should help increase how effectively Design and Build can transition value through the different parties in the supply chain; a factor which Kelly *et al* (2004), consider to be a measure of the effectiveness of a procurement route.

The case study was based around a large nationwide main contracting organisation, who took the protagonist role as they were considering developing their approach to SCM, and its relationships with its subcontractors. The large range of subcontract order values and types of work undertaken, provide a broad contextual base from which the findings can be transferred.

The first section of the chapter focused on relationships, which emerged as the most important factor for both the main contractor and their subcontractors; a finding which has a long standing and widely recognised history in UK construction management research (Latham, 1994; Egan, 1998). More specifically, the need to develop approaches which develop and maintain healthy relationships between main contractor and subcontractor, was considered to be the most important factor impacting on the ability to work effectively together and meet the client's value system. Whilst in many instances those involved in the study were failing to consistently develop and maintain such relationships, the data suggests that the pockets of practice where this was the case leads to mutual benefits for both parties; not simply the contractor.

Another important finding is the way in which individuals hold differing beliefs about the success of particular projects they had been involved in, and how fairly they had been treated. The case study methodology allowed the findings to emerge by considering the same projects, and individual issues from those projects, from different perspectives. It would seem that the need to ensure that the different organisations mutually derive benefit is considered to be an essential aspect of developing healthy relationships. This finding concurs with Dainty *et al* (2001).

The chapter went on to explore the following properties which emerged as being the most important aspects of developing and maintaining healthy relationships:

- Trust.
- Communication.
- Collaboration.
- Commitment.
- Integrity and Honesty.
- Concern for each other's interests.
- Recognition and Incentives.
- Transferability.

The second section of the chapter went on to explore tendering-specific issues in Design and Build. Once more, the Grounded Theory-led case study methodology allowed new issues to emerge and be explored precisely from multiple perspectives. This allowed previously undiscovered issues to emerge which have a major impact on the ability to transfer, and add, value through the supply chain, and therefore help increase the effectiveness of Design and Build tendering.

For example, the issue of poor tender returns and secondary sendouts emerged as an extremely significant issue. In many instances, the contractor was found to be failing to secure subcontractors' early input into the scheme. This lack of input was felt in the most tangible way by a lack of tender returns from subcontractors they had requested prices from. The problem is fuelled by the contractor often carrying out a second round of tendering following them securing the main contract (secondary sendouts). In addition to leading to a reduction in the subcontractors propensity to tender, secondary sendouts reduce subcontractors value engineering input, which is an important way of realigning developed Design and Build with its original tenet of contractor design. Significantly, secondary sendouts contravene the principles of selective tendering at the main contractor-subcontractor level; principles which have been the subject of repeated high-level guidance for many years (Simon, 1944; Banwell, 1967; Latham, 1994).

Another tendering related issue was the finding that contractors are often breaching subcontractors Intellectual Property Rights (IPR). Subcontractor's providing a design function, as part of their service provision at tender stage, complained that their design and ideas were often passed around other subcontractors by the main contractor in an effort to 'level the playing field' and ultimately reduce prices. Subcontractors who had suffered in this way were less likely to become involved in tendering, and where they did become involved were less likely to become fully involved in value engineering and share their ideas. This finding has serious implications for the transfer of the client's value system and the propensity for the supply chain to add value.

One of the most significant findings, which is not reported in the literature, is that of unsolicited enquiries which are often received by contractors either prior to the submission of their tender to the client or following them successfully securing the main contract. These tenders often contain temptingly low tender prices to gain contractor's interest, yet at the same time represent significant risks, as they are received with little time to conduct a rigorous evaluation. The findings suggest that the temptingly low tender price often grows during the contract period. Similarly, they reduce subcontractors' propensity to become involved in supporting contractors at tender stage as the subcontractor's work may be wasted if the contractor chooses to form a contract with the subcontractor submitting the unsolicited tender. Once more, they represent a serious threat to the ability to transfer the client's value system through the supply chain and highlight the differences between tender processes at the client-main contractor and main contractor-client levels in the supply chain.

Other issues which were found to be important in terms of developing contractor-centric SCM include the lack of consolidated main contractor expenditure, volume rebate arrangements, inefficient subcontractor order processing, binary decision-making and lowest capital cost-selection criteria, time constraints and a lack of ability to develop a shared culture with subcontractors. Whilst the findings highlight the often ineffective processes and poor quality of relationships which exist in main contractor-subcontractor tender processes, they also point to many pockets of healthy relationships and effective tender processes.

However, contrasting the tender processes which are carried out at the main contractor-subcontractor level of the supply chain, with those carried out at the client-main contactor level, shows how uncontrolled and ineffective they often are. These findings represent serious implications for the effective transition of client value and the overall effectiveness of Design and Build tendering. It would seem that the myopic focus on client-main contractor tendering has resulted in many ineffective practices being allowed to perpetuate at the main contractor-subcontractor level. Ironically, the focus on client-main contractor tender processes, by the majority of the research community, fails to ensure effective Design and Build tendering as the wider supply chain continues to engage in ineffective tender processes and relationship management. It is hoped that the findings of this study will be used to inform contractor-centric SCM and in order that the Design and Build tender process can be improved to help the way it transmits and indeed adds to, client value.

Chapter 7: Conclusions

7.1 INTRODUCTION

7.2 RESEARCH OBJECTIVES

7.3 CONTRIBUTIONS TO KNOWLEDGE

7.4 RECOMMENDATIONS FOR FUTURE RESEARCH

7.1 Introduction

This chapter draws the thesis to a close by making explicit the key conclusions of the study, and outlining recommendations to improve the effectiveness of Design and Build tendering. The chapter commences by revisiting each research objective, in turn, and clarifying how they have been met in the thesis. The findings from the work are discussed in order to illuminate the contributions to knowledge which collectively help increase the effectiveness of Design and Build tendering. The chapter concludes by outlining areas for future research.

7. 2 Research Objectives

7.2.1 Objective 1: To understand the nature of the Design and Build Tendering Process.

Chapter two began to address this objective by firstly gaining an understanding of the nature of Design and Build through contrasting it with its counterpart Traditional Contracting. It was argued that Design and Build can be considered a family of procurement options, principally defined by the degree of pre-contractor design and specification development. It was rediscovered in UK construction owing to the way that its integrative nature offered the ability to avert many of the problems associated with the fractured nature of Traditional Contracting.

Chapter three developed this understanding by charting the progression of tendering in UK construction, and drawing attention to the continued high-level support for selective tendering, evaluating contractors on the basis of overall value for money, and the need to ensure contractors, and the wider supply chain, are involved from an early stage in the project process. Continuing a theme which was introduced in chapter two, the chapter went on to draw these strands together and argued that, whilst Design and Build tendering is generally forwarded as being more complex than Traditional Contracting tendering, this understanding needs to be sensitised by the *type* of Design and Build project being tendered. It concluded by arguing that there is a lack of guidance for practitioners involved in the range of Design and Build tendering.

7.2.2 Objective 2: To explore client-main contractor tendering processes in Design and Build

Chapter five met this objective by studying client and main contractor tender processes in a range of Design and Build projects. A significant finding, which emerged during the study, was the increasing popularity of developed forms of Design and Build, which are characterised by significant amounts of pre-contractor design and specification development. The study used the conceptual categories of Detail-Developed Design and Build, which has significant pre-contractor design and specification development, and Pure Design and Build, with minimal design and specification development, which emerged during the research, to explain the two extremes of Design and Build.

Many examples of Design and Build were uncovered where the design and specification development, carried out prior to tender, was so great that the projects could be likened to Traditional Contracting. The significant difference being that the developed forms of Design and Build were legally administered using Design and Build forms of contract where the risk, for design and construction, is passed to the construction contractor. This is a significant finding as it means that many projects labelled ‘Design and Build’, actually considerably diverge from what is traditionally understood as the original maxim of Design and Build; integrating design and construction through centrally involving the contractor.

The chapter went on to explore the reasons behind the increasing use of developed forms of Design and Build, and found that risk transfer was the key theme related to the following lower order themes:

- Tender Cost and Complexity.
- Consultant advice on Project Complexity.
- Client Type.
- Consultant Professionalism.
- Accelerated Project Programme.

It was argued that the broad and expansive rationale for using developed forms of Design and Build, uncovered in the study, illustrates how ingrained the use of this type of Design and Build has become. Moreover, it concluded that this is an extremely significant finding, as developed forms of Design and Build inhibit the effective transition of the client’s value system at tender stage.

Drawing on an important issue uncovered in chapter two, that the reported complexity of Design and Build tendering needs sensitising by considering the *type* of Design and Build, the chapter continued by outlining the nature of tender processes in different types of Design and Build. Developed forms of Design and Build were found to be characterised by relatively simple tender processes. Tendering on these types of projects generally involved selective competition, checking compliance with the Employer's Requirements document, followed by a lowest capital cost based evaluation.

The chapter went on to explore the need for contractors tendering for the works to comply with the Employer's Requirements. Significantly, it was found that contractors often find it difficult to comply with the client's scheme as encapsulated in the Employer's Requirements. Contractors often qualify tenders in order to reject what they consider to be the unreasonable risk the client wishes to transfer to them; qualifications which can, in some instances, lead to them being disqualified from the tender competition. The high regard the client's advisors place on unqualified compliant tenders, was illustrated by an example uncovered in the study, where a £10,000 bond was requested from tendering contractors to ensure their tenders were fully compliant.

This is an extremely important point, as it illustrates how the client's decision to use developed forms of Design and Build to transfer risk, is becoming disproportionate and leading to inefficiency in the tender process. In addition, developed forms of Design and Build require contractors to digest substantial amounts of information in compressed tender periods, which reduce their ability to understand the client's value system as encapsulated in the Employer's Requirements. Not only does this lead to a disproportionate increase in contractors' risk profiles, it represents an inability to transfer client value at a major tender transition point. Significantly, this poses a real threat to the client's ability to meet their value objectives through the construction project. Taking account of the way that the success of a procurement route can be measured by how it enables the various value transition points to work effectively (Kelly *et al,* 2004), this finding illustrates how developed forms of Design and Build, characterised by substantial risk transfer, and short tender periods, are failing in this respect.

The analogy of a value thread, which is used to draw attention to how fragile the journey is, from identifying a need and then fulfilling it with a construction project (Bell, 1994), is useful in this scenario to underline how the use of this type of Design and Build tendering can complicate an already delicate journey. Importantly, clients are often divorced from both the way their value system is articulated in the Employers Requirements documents, and in the tender process itself, and are not aware of the often unreasonable terms and conditions which contractors are expected to accept.

Alternatives and Menu Pricing in developed forms of Design and Build were explored next, and are discussed under the heading of Objective three below. The chapter went on to explore the nature of tendering in Pure Design and Build projects. It was found that tendering in these types of Design and Build projects takes the form of two-stage tenders (with or without an element of initial proposal development), or single-stage 'beauty parade' approaches.

Two-stage tenders enable contractors to become involved earlier in developing the project. Those structured with an element of initial proposal development, involve contractors developing the scheme iteratively with the client and their consultants, at stage one, whilst in competition with other contractors. Clients evaluate these submissions using multi-attribute analysis (MAA) techniques, following an Identify Weight and Rate (IWR) format. The successful contractor is awarded preferred bidder status and develops the project with the client and consultants in the second stage. This type of Design and Build was found to be increasingly rarely used in practice, as it involves a number of contractors incurring tender development costs.

Two-stage tenders, without initial proposal development, reduce the amount of work contractors carry out whilst in competition. At the first stage, a number of contractors, possibly four or five, price schedules, preliminary items, declare overhead and profit requirements, and articulate their overall approach to managing the rest of the project. From these submissions, the client will select a preferred bidder. Contractors were found to prefer this type of two-stage Design and Build as it reduced the amount of work they carried out at risk. Both forms of two-stage tendering offer contractors, who have been granted preferred bidder status, the additional benefit of being reimbursed for the work they carry out in the second stage of the tender process, in circumstances where the project does not proceed to construction.

The Single-Stage ‘beauty parade’ Design and Build tender process, is mainly carried out on pure forms of Design and Build, although it does extend to some projects with a partially developed design and specification. This type of tender process is perhaps the traditional archetype of Design and Build tendering. The client, and their advisors, choose from various scheme designs developed by different contractors to meet the client's needs. The difficulty of comparing 'apples and pears' characterises this type of process and MAA techniques (in an IWR format), were found being used to evaluate the proposals. These techniques evaluate the tenders using different criteria developed to match the client's value system. However, whilst blending price and quality evaluations, in this way, is relatively straightforward, lowest capital cost was still found often to be the most important factor once a threshold of quality had been met.

This is a significant finding as it highlights the way that the high-profile messages to select contractors on the basis of overall value for money (Latham, 1994; Egan, 1998), are often being tempered by clients and their advisors. Significantly, this often means that whole-life costs, generated by Life Cycle Costing (LCC) techniques, are not being incorporated within evaluation exercises; a finding which illustrates the limited extent to which value-based selection is actually being carried out in practice.

7.2.3 Objective 3: To identify best practice relevant to the client and main contractor tender process in Design and Build

Meeting this objective is clearly a key component in increasing the effectiveness of Design and Build tendering. The precise nature of the objective, focusing on the client and main contractor tender process, sensitises the reader to the different levels of tendering in the Design and Build tender process. It is important to note that the depth of study, that the research methodology allowed, enabled Design and Build tendering to be further split into the two main areas of client-main contractor tender processes and main contractor-subcontractor tender processes. As such, various additional areas of best practice are incorporated in later sections of this chapter under the heading of objective five and six in this chapter.

The importance given to tender processes in UK construction research was clearly evidenced in chapter three. However, the overwhelming focus of these long-standing, high profile, calls to improve tender practice, have been located at the client-main contractor level of the industry. Importantly, whilst Design and Build has long been forwarded as a procurement route which can help increase industry performance (CIOB, 1988; Bennett *et al,* 1996), and tender processes have long been identified as a similarly important aspect of project success (Simon, 1944; Banwell, 1964; Latham, 1994; Strategic Forum, 2002), there has been a dearth of research focusing specifically on increasing the effectiveness of Design and Build tendering.

This research highlighted several areas of best practice:

- Alternatives.
- Menu Pricing.
- Value Management-based Tender Evaluation Process.

7.2.3.1 Alternatives

The investigation of tendering for developed forms of Design and Build concluded by adding to knowledge in the field, by introducing the concept of alternatives. Alternatives are offered by contractors, *in addition* to a compliant tender, and incorporate their suggestions for different materials, methods of construction, programme, work phasing and consultant selection. Contractors often keep the details of alternatives vague at tender stage in order to stop them being shared by the client with other contractors, and because there is often insufficient time to develop them to any great extent. Whilst alternatives are not recognised in the literature, they importantly offer a way of creating competitive advantage for contractors, thereby allowing them to add value to developed Design and Build projects.

Alternatives offer contractors the ability to realign developed forms of Design and Build with the original tenet of integrating design and construction, through centrally involving the contractor. As such, they are in tune with the central message of encouraging contractor value addition, which is so prevalent in UK construction best practice literature (see for example Holt, 1995 and CIRIA, 1998). Importantly, the popularity of alternatives is evidenced by the finding that 32.7 percent of contractors always submit alternatives in addition to their compliant bid, whilst 61.2 percent sometimes carry out the same practice.

7.2.3.2 Menu Pricing

Menu pricing, a close relation to alternatives, is similarly unrecognised in the literature. The term describes a situation where clients incorporate their own suggestions for alternatives in their tender documents, in a type of menu pricing arrangement, so that every contractor that tenders prices the clients menu of alternatives as part of their tender submission. Once more, the popularity of menu pricing is evidenced in the data as 24.5 percent of contractors had experience of clients incorporating it in their tender processes.

7.2.3.3 Value Management-Based Tender Evaluation Process

Pure Design and Build processes often focus on lowest capital cost. Whilst two-stage and negotiated approaches were found to be orientated towards a focus on value for money, this was not always the case. As such, Value Management (VM) based approach to Design and Build tendering was developed to help increase the effective transition of client value. Based on the work of Green's (1992) simple multi-attribute rating technique (SMART), the process was developed in conjunction with practitioners involved in the study, to help ensure it was fit for purpose, and able to be simply applied in practice.

The process is structured in six stages, encompassing the initial definition of the client's value system, through to the selection of the main contractor at the key tender transition point. The process can be carried out in two workshops: 1) the pre-brief, and 2), brief development workshop. The six stages are structured as follows:

1. Process Introduction.
2. Scheme Objectives.
3. Value Tree Construction Demonstration.
4. Construction of a Value Tree.
5. Weighting the Value Tree.
6. Contractors' Design Proposals evaluated against the Value Tree.

The approach is designed to select the contractor providing the best overall fit with the client's value system. In terms of output, the process eventually leads to each tendering contractor being assigned a numerical score, which is used to *inform* the decision-making process; *not* as an answer in itself. The process represents a unique and novel synthesis of VM and Design Build tendering. It is recommended that clients use the process to help increase the effectiveness of Design and Build tendering and aid the transition of client value.

7.2.4 Objective 4: To critically explore the concept and communication of client value in Design and Build Tendering

This objective is fundamentally important as it provides the necessary background to the concept of value. Value is one of the most commonly traded terms in UK construction best practice literature, and is particularly important in terms of tendering, as the movement to select on the basis of overall value for money attests (see for example Latham, 1994 and CIRIA, 1998). Referred to in various ways, such as 'value adding', and 'best value', the need to critically examine the concept of value, formed the starting point of meeting this objective in chapter two.

The thesis explored theoretical issues relating to value. The concepts of value in use, value in exchange, esteem value and cost value were used to explain the different properties of value. It was found that people hold different perceptions about what constitutes value; something which is important in construction management, as the literature often discusses 'the client' in unitary terms. Similarly, the economic concepts of diminishing marginal utility, indifference curve analysis and budget constraints, were drawn on to argue that construction clients make decisions between differing options, with the aim of selecting the best solution given the decision constraints. The chapter went on to explore theoretical problems associated with measuring value, and found that whilst there are fundamental problems with cardinal measures of value, they are nevertheless pragmatically adopted in many value management studies.

The section continued developing an understanding of value by considering how it is communicated. As stated, the effectiveness of a procurement route is judged by how it enables the various value transition points to work effectively (Kelly *et al,* 2004). The concept of the value chain (Kelly and Male, 1992), was used to show the journey from identifying a need to be met, and then meeting that need with a construction project. This is an important point, as the tender process represents a significant link in the value chain. Drawing on Standing's (2001) work, drew attention to the multitude of various value switch points, which take place during a construction project at different points in the construction supply chain. This work, allied to the emerging importance in the data of subcontractors supporting main contractors in developing their tenders in Design and Build, led to a focus on tender processes at the main contractor-subcontractor level in the supply chain.

Importantly, main contractor-subcontractor tender processes have suffered from a distinct lack of research focus. The new and important findings stemming from this decision to explore different levels of the supply chain, in order to increase the effectiveness of Design and Build tendering, represent significant contributions to knowledge and are discussed below under objective five and six. This addition to the client-main contractor focus of improving tender performance was amalgamated with an enquiry into SCM, and more specifically construction-specific SCM. The inclusion of SCM enables the integrative properties of this increasingly important best practice approach to help improve the effectiveness of Design and Build tendering.

7.2.5 Objective 5: To explore main contractor-subcontractor tendering processes in Design and Build

Objective 6: To explore the potential for contractor-centric Supply Chain Management to increase the effectiveness of Design and Build tendering

Chapter three, and chapter six, met these two objectives, and they are dealt with concurrently here owing to their synergies. In tandem, these objectives take account of one of the key contributions to knowledge which emerged during the study; that the almost myopic focus on client-main contractor tender processes fails to take account of the numerous crucially important main contractor-subcontractor tender processes. The need to ensure that the client value system is transferred throughout the wider supply chain, is well founded (Standing, 2001; Kelly *et al,* 2004). Concentrating efforts on increasing the effectiveness of Design and Build tendering by solely focusing on the client-main contractor tender process, will only allow limited benefit, and fail to harness the collective energies of the wider supply chain. As such, the findings explored below represent a unique and innovative synthesis of the client’s value system, SCM, and Design and Build tendering.

This point is underlined by considering that, for every client-main contractor tender process which takes place, there are many more main contractor-led tender processes which take place between the main contractor and different parties in their respective supply chains. Of all the main contractor-led tender processes, the many main contractor-subcontractor tender transition points are perhaps the most important, as they often include a design function and were found to collectively account for 70-75 percent of the capital expenditure on construction projects. As such, the case study focused on the main contractor-subcontractor level of the supply chain.

SCM literature was reviewed in chapter three in order to map the field and inform the ongoing data collection. The case study approach to data collection, which was utilised for this aspect of the research, provided the necessary depth of enquiry required. Gaining a sufficiently strong purchase on these previously undiscovered issues relied on being able to isolate specific issues, which occurred in a particular context, and project-specific situation, and study them from the viewpoints of different professions, organisations, sectors, and sides of the buyer-seller divide. The case study approach adopted enabled these multi-faceted perceptions to be taken into account, and similarly, the use of Computer Aided Qualitative Data Analysis Software (CAQDAS), helped develop these complex issues in a systematic manner.

It was argued that the way SCM is focused around value generation, rather than simple cost reduction, allied to its ability to integrate the project process, offers much to the client keen to realise value through their construction project. SCM has been increasingly proposed as a way to increase performance in the UK construction industry (Egan, 1998; Holti *et al,* 2000). Whilst calls for construction-based SCM place the client in the leading role (see for example Latham, 1994; Strategic Forum, 2002; Briscoe *et al* 2004), there is a lack of clients with the requisite standardised, long-term demand to develop successful highly collaborative partnered supply chains (Cox *et al,* 2007). Drawing on Male and Mitrovic's (2005) concept of the organisational supply chain (OSC), which describes the main contractor's supply chain, it was argued that main contracting organisations can form their own approach to SCM, termed 'contractor-centric' SCM. This approach to SCM is able to impact on a multitude of specific projects, thereby removing the problem of few clients having the necessary demand profile to lead client-centric SCM.

Whilst some researchers are less accepting of the potential benefits of SCM, believing much of it is founded and perpetuated on a diet of dogma and rhetoric (Green, 1999), London's (2008) criticism, that there are a lack of SCM approaches which take account of the wide range of behaviours, and organisational factors, which comprise the different tiers of the supply chain, is important to this work. His criticisms of the overriding focus on the client and main contractor level of the supply chain have much in common with the argument forwarded in this thesis in relation to Design and Build tendering.

The decision to explore deeper levels in the supply chain, specifically at the level of main contractor-subcontractor, led to relationships emerging as being crucially important. Whilst construction research has long recognised the importance of relationships (Emerson, 1962), a recognition similarly shared in buyer-supplier exchange theory (see for example Bullington and Bullington, 2005), this study adds a contribution to knowledge by studying relationships located at the main contractor-subcontractor level of the supply chain in Design and Build tendering. It was found that effective tender practice requires an effective approach to managing the supply chain, which in turn relies on healthy relationships between the main contractor and their numerous subcontractors. It is argued that the following relationship properties must be developed and cultivated in order to healthy relationships:

- Trust.
- Communication.
- Collaboration.
- Commitment.
- Integrity and Honesty.
- Concern for each other's interests.
- Recognition and Incentives.
- Transferability.

The findings clearly show that approaches to SCM, which fail to recognise and reward the strength of relationship between the main contractor and subcontractor with tangible benefits, will fail to harness maximum advantage. As such, it is recommended that contractors develop their SCM strategy to include a differential based on relationships and performance. This differential could take the form of a hierarchy based around the strength of relationship between the contractor and their various subcontractors, in addition to the consistency of their performance. Differentiating between subcontractors in this way, is based on the premise that subcontractors should be rewarded for excellent performance. Similarly, consistent underperformers could eventually be replaced following efforts to improve their performance. Each hierarchical level could confer a mixture of tangible benefits, and corresponding responsibilities, for the main contractor and their supply chain partners, which would be extra to, and not embodied within, the actual sub-contract.

Moving on to consider Design and Build tendering-specific issues, at the main contractor-subcontractor level of the supply chain, led to numerous highly important findings emerging from the study. It is of paramount importance that main contractors and their subcontractors take account of these issues, particularly through contractor-centric SCM, in order to leverage the significant opportunity they possess to increase the effectiveness of Design and Build tendering. The detailed and rounded understanding, of these previously unreported issues, demonstrates the fitness for purpose of the research design adopted in this work. The issues are revisited below, demonstrating their useful contributions to knowledge:

7.2.5.1 'Secondary Sendouts'

It was found that the main contractor's often suffer from poor tender returns from their subcontractors, when tendering for projects. This lack of tender development work, and pricing, reduces the effective transition of the clients' value system through the supply chain. Similarly, the potential for the supply chain to add value is not being realised, in addition to contractors' risk profile increasing, as they are sometimes offering to carry out works for which they have not gained their subcontractors input. The problem is fuelled by the way that main contractors often carry out a second round of tendering, termed 'secondary sendouts', once they have secured the main contract. This second round of tendering is carried out both with the intention of reducing prices, and owing to the way that the contracting organisation's internal structure, leads to dissonance between pre-construction and operations staff (as they often use different subcontractors).

Clearly, the way secondary sendouts lead to a reduction in value transition, and addition, and lead to a corresponding increase in contractors' risk profiles, has serious implications for effective Design and Build tendering. As such, it is recommended that contractors incorporate specific clauses in their SCM strategy to inhibit the use of secondary sendouts, except in certain defined situations. For example, the defined situations could include where they are unable to agree contract terms and conditions with those subcontractors who support them at tender stage.

Additionally, the number of subcontractors involved in the first round of tendering should be limited to a certain number, possibly four, to increase the probability that the subcontractors will secure a contract for their efforts at tender stage. It is advised that clients should similarly adopt similar policies, by insisting that contractors include a statement in their tender clarifying how they plan to inhibit the practice of secondary sendouts. Adopting these recommendations will help increase the subcontractors' propensity to support the tender, thereby increasing value transition, in addition to reducing the contractor's risk profile, and use of resources, associated with two inefficient rounds of tendering.

7.2.5.2 Subcontractor Intellectual Property Rights

In this context, subcontractors' Intellectual Property Rights (IPR), refer to their ideas and designs developed as part of the Design and Build tender process. Subcontractors who carry out a design function suffer, in some circumstances, from their designs and ideas being shared with other subcontractors tendering for the same works by the contractor. This practice is carried out to reduce costs and 'level the playing field'.

This practice seriously inhibits subcontractors' propensity to tender for the works and add value to the process. In addition, it fundamentally damages the relationship between the two parties. It is recommended that contractors incorporate specific clauses in their SCM strategy to inhibit this practice, and ensure subcontractors are made aware of their approach. Clients should similarly adopt these policies, by insisting that contractors include a statement in their tender clarifying how they plan to inhibit the breach of subcontractors' IPR.

7.2.5.3 Unsolicited Tenders

Unsolicited tenders, also sometimes called 'poach quotes'; are tenders which subcontractors send to main contractors without being solicited to do so. Unsolicited tenders are both received prior to the main contractor's tender submission, and following the main contractor being awarded the contract. Those received prior to the main contractor tender submission represent the biggest threat to effective Design and Build tendering, as they are often received with insufficient time to enable the main contractor to carry out a rigorous evaluation. In addition, unsolicited tenders often include a low tender price, which leaves the contractor in a position that they may be uncompetitive, if they choose not to use the unsolicited tender. Their potential to drastically increase contractors' risk profile is clearly evident.

Similarly, unsolicited tenders inhibit those subcontractors, who were solicited to tender, from getting involved at tender stage. Where these subcontractors have knowledge of contractors accepting unsolicited tenders, they are less likely to provide their full support in future. The increased risk profile unsolicited tenders represent for contractors, who decide to use them, is clearly demonstrated by the finding that their low tender price often grows through the contract period, and leads to an inflated final account cost. It is recommended that contractors incorporate specific clauses in their SCM strategy to inhibit the ability to place orders with a subcontractor submitting an unsolicited tender. Clients should similarly adopt preventative policies, by insisting that contractors include a statement, in their tender, clarifying how they will remove the ability to place orders with subcontractors submitting unsolicited tenders. The concern that contractors have over not using an unsolicited tender with a lower price (that it will potentially be used by their competitors), can be dealt with in a number of ways:

- Where time permits, seek to understand why an unsolicited tender price is lower, and attempt to get solicited tenderers to beat, or match, the lower price.

- Where time does not permit, take a commercial decision whether to use the lower priced unsolicited tender in the client's tender, on the basis that value engineering, and the support of solicited subcontractors, will enable the lower price to be realised.
- In instances where it is felt that the unsolicited price is unrealistically low, and cannot be realised in the long-term, bring the unrealistically low tender price to the client's attention to ensure they are aware of its potential to affect project success.

7.2.5.4 Lack of Consolidated Expenditure

Where main contractors fail to consolidate their subcontract expenditure, it contributes to a lack of support at tender stage, inconsistent performance and poor quality work. Another way that unconsolidated expenditure impacts, is through failing to gain maximum benefit through volume rebate arrangements which financially reward the contractor for purchasing generally predefined volumes of products or services.

Such rebate agreements are an intrinsic part of SCM and are able to create competitive advantage for contractors at tender stage. Whilst such agreements were found to be in place between the contractor and a number of suppliers, there was a feeling that the significant benefits available were not being maximised. It is recommended that contractors develop their SCM strategy such that they seek to consolidate expenditure with fewer subcontractors. Whilst it is recommended that contractors incorporate consolidated expenditure in their SCM strategy, it is also advised that new subcontractors are continually introduced into the contractors' supply chain, and tender lists are agreed on a project-specific basis, to ensure that subcontractors remain competitive. In this way, consolidation can help align different organisations business objectives and help increase the ability to focus potentially disparate organisations, and individuals, on meeting the client's value system.

7.2.5.5 *Inefficient Subcontract Order Processing*

Contractors' tender processes involve numerous types of subcontract packages, which can be categorised in different order value bands. Each order requires time-consuming administration, and is generally placed following a process that involves the receipt of numerous quotations from various subcontractors. The costs associated with these processes are significant. The data shows that this use of resources, by the main contractor and numerous subcontractors, inevitably leads to additional costs being incurred by all parties.

The financial cost of administering this high number of orders is amplified by the significant use of time they demand. As such, the contractor's internal company procedures are exerting time pressures, which similarly impact on the ability subcontractor's ability to add value. This finding is incredibly important as it highlights how different subcontract packages, with different values, scopes of work, and ultimately differing impacts on client value, require essentially the same amount of time and effort from the contractor's staff.

It is recommended that contractors seek to differentiate the different types, and values of orders, to increase the effectiveness of their administration in a more focused way. At tender stage, reducing the need to administer numerous tender processes for low value simple orders, through the use of annualised framework agreements, will enable resources to be more effectively utilised on complex high-value packages. As such, client value can be more effectively transitioned through the supply chain, and increased through value engineering exercises and earlier discussion and dialogue.

7.2.5.6 Simple Selection Criteria

Meeting objective five and six led to the finding that the selection criteria, that main contractors use to select their subcontractors, often incorporate overly simplistic criteria, and fail to take account of overall value for money. For example, the criteria consist of a yes, or no, binary subcontractor database approval process, possible review of the subcontractor's previous performance, and a simple identification of the lowest quotation cost. Significantly, it was found that low tender prices often substantially increased during the term of the contract, leading to highly inflated final accounts, thereby underlining how a myopic focus on the lowest capital cost leads to tangible problems for contractors.

This extremely important finding demonstrates that, irrespective of the value-orientated tender processes which take place at the client-main contractor tender switch point in Design and Build projects, (the overriding focus of UK construction research), client value can be compromised where these approaches are not utilised at different points in the construction supply chain.

Nevertheless, contractors' staff still believed that following a more value-orientated selection agenda could make them uncompetitive in the marketplace. It is recommended that contractors should develop their selection processes by basing their approach on accurate information. In this instance, this means routinely analysing and considering the relationship between the price received at tender stage, and the price of the final account, and measuring subcontractors' wider performance using a range of measures. Similarly, the binary yes, or no, approval processes, found to be the norm, should be replaced with the hierarchy model articulated earlier in this chapter. Such an approach, allied to accurate measurement of subcontractor performance, offers the potential to drastically increase the effectiveness of subcontractor selection decision-making at tender stage.

7.2.5.7 *Client-Subcontractor Tender Coalitions*

An interesting finding which emerged during the study, was the way in which some clients, experienced repeat procurers, are choosing to contract direct with subcontractors with a design input. Clients are choosing to adopt such an approach owing to the way much specialist knowledge now resides within the subcontracting organisations. Whilst it does allow clients to start early dialogue with subcontractors, it was found to increase main contractors' risk profiles and lead to problems associated with the client's inability to manage the input of the different subcontractors. In addition, the differing responsibilities can lead to complications agreeing the nature of the Design and Build form of contract. This is an important finding as it effectively interrupts the way the Design and Build procurement route is structured to transition value; from main contractor to subcontractor. Such an interruption, whilst rationalised by drawing on the benefits of gaining specialist knowledge from an early stage, can affect the ability of Design and Build to realise client value.

It would seem that just as clients' aversion to risk is driving developed forms of Design and Build, their wish to use specialist knowledge is driving early subcontractor coalitions. However, it should be borne in mind, by those adopting this approach, that purer forms of Design and Build offer the potential for the main contractor and subcontractors to get involved from an early stage. Of key importance in this regard, is the way that contractors have much to offer the process; not least of which is their experience in managing the input of numerous subcontractors. Clients are advised to involve main contractors in early discussions, and not 'short-circuit' the Design and Build process.

7.2.5.8 Time Constraints

Just as time constraints impact on client-main contractor tender processes, they also exert pressure on tendering at the main contractor-subcontractor level of the supply chain. This is a significant finding as it illustrates how time constraints impact on the ability to understand the project as encapsulated in the various tender documents, and affect subcontractors' ability to innovate and value engineer at tender stage. Less time means less ability to challenge the scheme. In this way, time constraints have an important impact on the ability to transfer value, and indeed add value, to the process at main contractor-subcontractor tender stage; one of the most fundamental value switch points.

Short tender periods inhibit effective tender processes, which are required to enable client value to be transferred and indeed increased. It is recommended that clients carefully consider the length of tender period they allow; more time will enable more effective tender periods. Clients should also request information from contractors articulating how they plan to manage the tender process.

7.2.5.9 Shared Culture

In tune with previous work on non-construction SCM (Simatupang and Sridharan, 2005), the findings stress the importance of aligning disparate organisational, and personal, objectives under the framework of SCM in order to increase the effectiveness of Design and Build tendering. The research concluded that the need for main contractors to share unified objectives with their subcontractors, underpinned by mutual benefits, was the most important factor in developing a shared culture. Whilst it will undoubtedly prove difficult to draw together so many differing personal and organisational objectives to a shared point, the findings suggest main contractors and subcontractors will be well served by embarking on a journey of deeper enquiry into what is important for the people, and organisations, they do business with. It is recommended that an expectations exchange should be used to start to develop this important dialogue. Formed under the structure of two questions asked of each party: 'what do you expect from this (the questioning) organisation?' and 'what do you *not* expect from this (the questioning) organisation?', this approach will enable important issues to be explored, which can then be used to help develop shared cultural traits.

In addition to taking account of the finding that a shared culture needs to be underpinned by mutual benefits, an understanding of what issues are important to the different individuals and organisations can be used to develop approaches to sharing benefits in an effective way. Taking the example of the main contractor, an understanding of what is important to subcontractors, whether generically, or in relation to specific subcontractors, or individuals, could be used in tandem with the hierarchy of performance and relationship strength (as articulated earlier in this chapter), to develop the benefits associated with each hierarchical level. Developing a shared culture, in this way, will help increase the effectiveness of Design and Build tendering by helping to transfer client value through the wider supply chain.

7.3 Contributions to Knowledge

The contributions to knowledge substantially develop the academic body of knowledge (shown on the following pages). Equally important is the industrial contribution to knowledge which has serious implications for those involved in investing substantial amounts of money in Design and Build construction projects in the UK on an annual basis.

To summarise, prior to the research being carried out, there was an acknowledgement that Design and Build tendering was an incredibly important part of achieving client value. However, there was a lack of detailed understanding of Design and Build tender processes, a problem which was exacerbated by the little research which had been carried out focusing almost myopically on the client-main contractor tender processes. Similarly, whilst the integrative potential of SCM had been recognised in popular construction best practice discourse, there was a lack of practical guidance for those organisations involved in Design and Build tendering aimed at helping them to utilise SCM. This problem was exacerbated by a focus on client-centric SCM.

The research has reframed and substantially developed these understandings. The research has explored and articulated the various types of Design and Build tendering, linking them principally to the amount of pre-contractor design and specification development, thereby allowing the type of tender competition to more closely match the type of Design and Build.

Moreover, the research has drawn attention to the importance of transitioning client value through the wider supply chain by focusing on main contractor-subcontractor tender processes, in addition to the client-main contractor tender process. The thesis argues for the use of contractor-centric SCM to enhance the effectiveness of Design and Build tendering. It was found that such an approach should be underpinned by healthy relationships, for which the essential properties were articulated. In addition, various important issues associated with main contractor-subcontractor tendering in Design and Build were found and make significant contributions to knowledge in this previously under-researched area. Specifically, the numerous and important contributions to knowledge are detailed below:

- Synthesised the previously disparate concepts of value, Design and Build tendering and Supply Chain Management in one study.

- Found that effective Design and Build tender processes relies on value transition not just at the client-main contractor level of the supply chain, but also at various tiers of the supply chain, principal of which is the main contractor-subcontractor level.

- Found that effective Design and Build tendering should be designed to take account of the type of Design and Build, specifically the differing degree of pre-contractor design and specification development. It has found that developed forms of Design and Build are incredibly popular and are being used owing to a number of factors including:

    - Risk Transfer
    - Tender Cost and Complexity
    - Consultant Advice on Project Complexity
    - Client Type
    - Consultant Professionalism
    - Accelerated Project Programme

  The popularity of developed forms of Design and Build is an incredibly important issue as it removes the original tenet of Design and Build: contractor design and specification development.

- Contractors and clients have developed ways to gain contractor input in the design and specification in developed forms of Design and Build in the form of menu pricing and alternatives. It was argued that the importance of menu pricing and alternatives should be elevated owing to their ability to add to client value on the hugely significant amounts of expenditure channelled through Design and Build procurement every year in the UK.

- Found that Purer forms of Design and Build, with little pre-contractor design and specification development were decreasing in popularity. The tender processes associated with the Design and Build were articulated and included single-stage beauty parade and two-stage approaches with or without initial proposal development. A Value Management-based approach to Pure Design and Build tendering was developed which offers the ability to seamlessly determine the clients collective value system and match this to the contractors proposals thereby enhancing the effectiveness of tender processes associated with this highly significant procurement route.

- Taking account of the few clients who have the repeat standardised long-term demand profile to successfully develop approaches to Supply Chain Management, it was argued that contractor-centric Supply Chain Management has a major role in enhancing the effectiveness of Design and Build tendering.

- Found that effective Design and Build tender processes rely on healthy relationships between the main contractor and their subcontractors. The thesis found that healthy relationships in this context rely on the following relationship properties being developed and cultivated:

- Trust.
- Communication,
- Collaboration,
- Commitment,
- Integrity and Honesty,
- Concern for each other's interests,
- Recognition and Incentives,
- Transferability.

• Found that the following previously unreported issues were incredibly important in ensuring the significant amounts of UK construction investment is funnelled effectively through the main contractor-subcontractor level of the supply chain:

  - 'Secondary Sendouts'
  - Subcontractor Intellectual Property Rights
  - Unsolicited Tenders
  - Lack of Consolidated Expenditure
  - Inefficient Subcontract Order Processing
  - Simple Selection Criteria
  - Client-Subcontractor Tender Coalitions
  - Time Constraints
  - Shared Culture

7.4 Recommendations for Future Research

The way in which this thesis has explored how different tiers in the supply chain collectively meet the client's value system in Design and Build tendering, could be developed in different ways. Clearly, the decision to explore both the client-main contractor, and main contractor-subcontractor level of the supply chain, has allowed a number of important findings to emerge. Future research could build on the work presented here, and seek to explore whether the recommendations incorporated in previous sections of this chapter increase the effectiveness of Design and Build tendering. Similarly, future research could explore other tender processes in the supply chain, beginning with the next highest expenditure category of suppliers. The importance of design, and the way that risk is apportioned through the supply chain, as found in this study, also increases the need to study main contractor-consultant relationships. These avenues of research could allow new findings to emerge which could help increase effective Design and Build tender practice.

The modified Grounded Theory mixed-method research design adopted in this study has proved how appropriate it is for this type of enquiry, and could be replicated in future research. As such, this approach supports the calls for greater methodological pluralism in the field of construction management research. Moreover, the case study approach would enable the recommendations to be trialled in a specific context, and the views of multiple parties to be taken into account, thereby enabling similarly incisive studies to be completed.

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Appendix A - Example Interview Transcript

*EPSRC D&B PROJECT

*P2 - NO.6

· 1-1

*28/11/2000

*VENUE: HIDDEN

*PRESENT: ANDREW KING, PARTICIPANT NAME HIDDEN

*AL = PARTICIPANT. A= ANDREW KING (INTERVIEWER)

*28/11/2000

*ANDREW KING, HIDDEN

*A

In what way do you work on design and build projects?

*AL

In all ways really, what generally happens is a client will come to us, will have a scheme, might have a design team onboard, might not, they will lay out what they are looking for, they'll probably ask us to advise on procurement routes. We will analyse it, go back to him present to him various options and if design and build is the most favourable option that is what we will recommend

*A

Right so, how do you actually decide whether design and build is....

*AL

Well we've got an in-house matrix system and we get our clients in, some clients are knowledgeable some aren't and some will come to us and say "I've done this bingo hall 25 times up and down the country, I've done it on design and build, I've not used your company before I want to try somebody different, that's the package this is the architect, I want to do design and build and I want it done for then". Others will come in and say "well this is what I'm thinking of doing, building a speculative shed up in Barnsley or something and I've touted one or two ideas about and I've got (hidden - a large retail client) interested in taking it" so we'll feed it through our matrix and obviously if its quite a simple scheme, uncomplicated, then generally we will suggest design and build, suggest that we take an employers agent role, which encompasses from our point of view, we're offering health and safety, QS, and you know just doing the whole package for them. We will chair all the meetings, push all the design through, do a cost plan, make a recommendation all the way through and then sometimes a client will come in and already know that he wants to use company A, B, C or D to do the works, we haven't even got to put a tender list together, we might comment on it and say "well they're not really geographically right, why don't you consider using 2 or 3 of them and then a couple of local firms, we might get a better price and whatever" and then what we will do is sit down with you and put all the employers requirements together, package it up and send it out to tender

*A

I'm trying to get at the stage of design development when it goes out to tender, I know some designs are quite prescriptive, quite well advanced when they go out to tender and some are let loose, what kind of experience do you have with that?

*AL

Well we've had it whereby the client the clients have come in and just say "all we want is a shed, I want to be able to put this in, that in" what we'll do is go to one or two architect firms that we work with get them in. Initially we will ask them to put a fee bid in to get involved and then what we will do is we'll know who the individuals are that we are putting forward and we'll make a recommendation to the client and again we might not necessarily recommend the cheapest quote, because we'll know what kind of service he is likely to get, but we will leave that final decision to him, and then what we'll do is get him involved get some sketch designs together and then once they are happy with that and the architect knows which way he is going and what the cost budget is and we can tell him sort of what materials he's got to think about utilising, we'll formulate it like that. Some instances you get, virtually a client will come to us and say "can I have a cost plan on this? The architect has recommended you" and in some instances unfortunately what we find is that an architect will have been contracted at first, the architect will have recommended a traditional route, he will come up with some design drawings, they might recommend us as QS's to do the initial cost plan, well look at the cost plan and get talking to the client and say "well why, what are you considering doing this on a JCT98 for or whatever the architect has suggested, this is so simple you'll get it done far quicker, you'll get it on site a lot faster by using design and build, still use these architects, still use these engineers"

*A

And go that route, its because the architect has decided that........

*AL

Well the architects might (emphasis on: might) have decided, they are not all like this, but a number of architects who we work with will push clients to a certain procurement route because of the fees

*A

Would you say its an equal split then between or what informs the different stages of design development, if you had a client that came to you didn't already have an architect on board what kind of design development would you go to and what would influence that prior to tender?

*AL

Well depending on what sort of is involved with the scheme; shall we say it is a shed?

*A

Yes

*AL

A simple shed, then what we will do is, we in-house will probably say is, we'll get a drawing out "is this the sort of thing that you are looking at, you're imagining?" show them some previous schemes, they might say "yes that's just what we want" but on the other hand it might not be a simple shed it might be something like an inner city whereby what he wants to do is he might have bought a chunk of properties and what he might be wanting to do is put retail units on ground floor with residential on first floor which wants quite a bit of input at design stage before you can produce a reasonable cost plan and sometimes that client will want more input, when the client wants more input it leads to more design initially

*A

So what are the factors in how well developed the design is before tendering? Is it to do with firming up that cost plan, is that what you mean?

*AL

Well it can be a number of things, it can be firming up the cost plan, it can be the complexity of the scheme, it could be the location of the scheme,

*A

Really?

*AL

In some instances yes

*A

How would that play a part?

(Not heard this one before)

*AL

What location?

*A

Yes

*AL

(pause) Right, we've got probably 6 or 7 at the moment inner city developments here and they might be grade 2 listed buildings, there might be input form English heritage and that's to do with the age of the building and the actual location of it, there might be buildings attached to listed buildings that don't actually require conservation work to it. To start throwing a client down a route of design and build without doing investigative work beforehand could be bad advice and that's purely because of the location. We've got dwellings that the local authority in Sheffield are wanting listed buildings to be renovated, these same listed buildings have been condemned by the city engineer, there has been already orders on it to take it down, they have then been rescinded because of (A: political implications of listing) yes, and things like that. Now this particular developer that I'm talking about now he's pulling his hair out because he bought the site and he got a local builder to buy it off him with planning permission for £975,000 and we were working with some local architects putting some cost plans together for the developer to use to be able to sell on but because of the location of it that has led to problems of off-site development being requested by planners, so do you see what I mean you've not just got that immediate design

*A

Yes there's a lot more involved, as you see you couldn't actually go out to tender with anything, without getting some preliminary work done

*AL

No, you see there's a lot. If we just go out to tender without these implications we would have led the client down garden path, he would have been forced into a position to pay fees, which not necessarily have been abortive, but the fees, all professional fees would have gone up, he's going to be on site a lot in theory he's going to have bought the site and have hold of that site for along time before his income is coming in

*A

If we actually get down now to how the tender is evaluated, how do you evaluate design and build tenders? Do you have a system in place?

*AL

We don't rigidly stick to it, but we've got different set tender reporting systems for each different type of procurement, and within them there is a guideline or checklist to look for so that the individuals aware of, he's got to take them, analyse them do a tender analysis, do a tender report and then when it comes to say something about yourself to check, there's got to be good reasons if they've not followed all them and invariably each scheme, obviously that list wont be concise, but we'll try to get them to think laterally and that's why our, I don't know whether you've seen our stupid company symbol which is like a square with a cloud on, that's supposed to mean thinking outside the norm

*A

I see, and is that a company ethic then?

*AL

Yes, what we do on design and build, obviously we look at price, we will look at how that price is weighted like you do on traditional JCT 80, when we go out to tender we always ask them to come back with a schedule of rates, which we don't always get back, and also like a BCIS tender analysis for them to fill in where the money is, we make sure that that is not weighted in the first place. Then we look at what exclusions they put in, we look at whether or not they are willing to comply with all the employers requirements, we are looking at whether or not they can actually produce the building to the programme that has been laid down - the time requirement, we'll look at what type of materials they are looking to use form a life-cycle costing point of view, and then what we will do is analyse it all, get the client in, get the architect in, it might be that in some instances the client has got a fantastic relationship with a particular architect and if the lowest tenderer, the contractor, the architect just doesn't want to work with and he wont want to be novated across do you know what I mean? We've had all those sort of problems because we will get some contractors, they have to look at how fee agreements are going to be set up, whether or not. You see invariably most times contractor will take onboard the design team and they will be set fees there, but what if that contractor is renowned for not paying those fees, or not paying them on time or things like that

*A

Yes, problems in-store for the architect really

*AL

Yes, more and more repetitive clients are looking to try and utilise the same sorts of 3, 4 contractors not necessarily in a partnering agreement, but in some sort of gentleman's agreement as I'd put it and they say" look, for a period of time well use you 3 or 4, but the first sign of any" they actually get them in, sit them down and say " right were considering using you 4 for the next 12 months on all our schemes if after 12 months you've not performed or we think you've been talking to each other then well just never use you again"

*A

Collusion. So you mentioned what kind of materials they intend on using for life cycle costing issues, does that mean then that it is more of a performance specification?

*AL

Well it can be it depends on whether its going to be design and build to be sold on or if you like the end user s going to be the developer, and the end user is our client

*A

So what would be the differences if the end-user going to be the client?

*AL

Well he's more interested in not just the functionality of the building, but he's also very interested in if you like the materials that are going to be used, what his maintenance costs are going to be, what his revenue budget is going to be to maintain the building

*A

So this client then is he more interested in firming up that design before he goes out to tender?

*AL

Yes

*A

So you are making a distinction there between developers intending on selling and clients who are going to retain the building one will go for performance and one will go for more prescriptive specification?

*AL

Yes

*A

Is that like a general rule really?

*A

Yes

(Ethically - the persons will not be identified in any way; I am conducting the transcription and keep hold of the tapes)

*AL

We work a lot with (hidden) and they are a very demanding client. They have used all different procurement routes. For along time they would not move away from the traditional route, more recently they've tried design and build and they've liked it, its got them on site much quicker because of their historical knowledge they've got construction directors, project directors that look after their design team, give them a kick up the arse all the time push them forward put lots of pressure on, pay good fees though, but what they do is with design and build, is because they do a lot of schemes (participant coughs cant decipher the word) repetitive end users as in (hidden - large financial industry client) buy a lot of stuff off them, but not only do (hidden - same large financial industry client) buy the scheme off them for their investment portfolio, but they buy that investment portfolio when it is finished and fully let, but there is agreement in place that will say " right you've done this before, you do it to them parameters, well agree to pay you X for it, I'm not bothered what it costs, but well pay you X for it when you've got 75% of every unit let, when you've got 90% of every unit let we will give you an additional, when you've got (Andrew: full capacity) well give you a bonus of this. What we are trying to do to get the incentive to get the clients in, they put a lot of nice features in, you know they want good quality products and they get people like Virgin, who always seem to jump in on a Helical scheme, there's people like (hidden - large retail clients), who from what I can gather historically were always there until (hidden - large retail client) recently had their cutback, but they are hoping to get them back in as their blue chip anchor tenant on schemes as soon as possible, they are well in with (hidden - another large retail client). So they've got a lot of large tenants that will move in and once you've got those big tenants moving in that then attracts all the other tenants, so its like on some of the out of town and inner-city retail developments that we've worked on, when we work on them with Helical the specification difference

*A
More prescriptive?

*AL
Oh yes, and not just more prescriptive, but it's the standard of workmanship, the quality of materials that they use

*A
In many cases these things are linked to a traditional you know the high quality, so they are using design and build, but they are still going for the high quality, why are they are using design and build then? Is it risk transference, time?

*AL
Yes, both of them in that we did a large inner city development with them in Middlesborough that, it doesn't matter who the consultants were, but initially I was the project surveyor for what was (hidden - a large professional practice) and throughout the 18-month contract the project manager was removed and replaced by the senior director form London, the senior associate who was the architect was removed and they got the director involved. (Hidden - a large developer client) asked for that director to be removed and the main man had to take over the scheme, the structural engineers were sacked, a different structural engineer was appointed, and there were 2 individuals, the M and the E engineer were replaced,

well not the company but the individuals were replaced because (hidden - the same large developer client) were so demanding as a client and because they were so critical of the design team, at one point we were something like £3.5 million over budget, the construction part of the scheme was about £14 million, now that £3.5 million was a bad insight on it. It should have been a traditional bill, we'd done a 2-stage tender, the information was crap

*A

Had it gone out fairly prescriptively then?

*AL

Oh yes, well what we did was we went out on a stage 1 bill of quants and everything should have been there and wasn't there, the design team as a whole, and I'm not just blowing my own or our companies, any QS firm would have picked it up because it was that bad, they just weren't proactive, they weren't doing what they should have been, nothing was coordinated, it was obvious to us at first stage tender that the actual steel frame didn't match the building and things like this and they had been working on it for over 18 months before we went out to 1st stage tender

*A

I'm a little confused, was it D&B?

*AL

This was traditional, and this was the one scheme that really made Helical move away form traditional

*A

Right, I'm with you now, I see what you are saying

*AL

And what happened was they'd got everything in place, they had done all the proper cost planning stages, they'd done about 7 or 8 cost plans throughout an 18month pre-tender stage, and everything was detailed, we had shown everybody where the design was moving, wed shown everybody where the design didn't match, and when we went out to tender, it was supposedly just a single stage tender, but we said "we cant, were just not ready to go out, the only way you are going to get this out on time, not to lose too much time is to go 2-stage tender, because the information we've got here this bill of quants just isn't functional" it just didn't, you couldn't build it, it wasn't a proper representation of what we were going to be actually constructing, so reluctantly the design team members agreed, we went out to tender and we went out to I think 6, I cant remember, and then we went out to the lowest 3, and in the 2nd stage tender because the information changed so radically. For the 2nd stage tender one of the 3 lowest people pulled out because he though we had been messing about, so that left 2 and then when we had gone through all the negotiations, got all the tenders in and it was still over budget, and we'd gone through a big negotiation stage as well as tendering and actually got it down to within the budget parameters, and the client pressed the green light 'go' it took 4,5 weeks that negotiation period, so we were eating into the programme all the time

*A

So you know the 1st stage, you had about 6 did you say (AL: yes) then you went to the 2nd stage, so after the 1st stage you knocked 3 out, you developed the design more, it altered radically, then on the 2nd stage then did you negotiate or did they have to put another bid back in then?

*AL

No, they had to retender on a different bill of quants

*A

Retender on a different bill of quants, the lowest one then negotiates, so effectively almost like a 3-stage process then?

*AL

Well, yes, and on the negotiation took place we were still over budget because the client knew what his income was going to be he then knew what it was going to cost him, he knew what if you like what the level of profit he wanted and it just wasn't tying up, so we negotiated and then told the architect "right these are the materials we've got to use" in some instances they would say "oh no we cant use" do you know what I mean? They weren't prepared because the design team were quite fragmented we were in Sheffield some were in Middlesborough, some were in Sheffield, we couldn't pull them all together and get them all to come up to Middlesborough sit round a table and work through it. And eventually when we got there we signed everything up, it was like somebody had just released a pressure valve and I can remember sitting in this particular meeting with the client and listening to all the design team talking and I turned round and said "well I'm sorry Sean but I cannot believe we are making these comments" and he said "why?" and I said "well we are starting on site in 8 weeks, to me we have got 8 weeks now to firm up the design, meet the design information that we have all signed up to, or all the designers have signed up to and I can't see us meeting these dates without a lot of input from the designers, and I can tell by everybody's attitude that they think its done, everybody around this table" we were sat round a table a bit bigger than this and I said "we've still got 40% of it to design properly to make it functionally work" they all sat there around the table and said "no he's wrong Sean" now round that table were probably 4 or 5 directors and they were all yes men, they'd all worked with Sean before, I hadn't worked with Sean before but over an 18 month period Sean doesn't work with them anymore he works with us, but I don't mean that to sound big-headed because the design team were that bad, and then on the next phase of the scheme and on future developments what they've done is they have gone down the design and build route, but it's a strong specification that we work to, its not a detailed design , but there's an outline design there for them to follow, they take all the design risk on, all of the coordination everything that went wrong on that traditional route shouldn't have gone wrong, it shouldn't have gone wrong but it did

*A

And that's led to a change in procurement strategy then

*AL

Yes

*AL

So, like that client changed his opinion of design and build because of the problems that he'd had with that particular scheme, with that particular design team. We luckily did quite well out of it, but I'm not saying that design and build is the best route for him to go down but he's a lot happier with it, we sat down and discussed it for half a day down in their offices, the different procurement routes, we did a report what went wrong, and how that (a) could be averted again using that particular procurement route, and what the alternative risks would have been with other procurement routes. Now it was a spiralling problem because it was eroding into the programme, we've got an end user, they'd got developments signed up, they were wanting because if you can imagine a retailer coming in wants to be either October for Christmas or he wants to be in February time for Easter/Summer and other than that they are not really that bothered, but that's what they look for, to get in especially around September October they get everything in, get it set up, get the staff trained, get all the PR done and get the Christmas period in, so that they are recouping a lot of the costs.

*A
So time is important in that once they've decided to go they want to keep their money tied up for as short a time as possible.

*AL
Yes, because what they do is they say "right, the last unit we will definitely finish for the end of October" and if we over run then what happens is they give their retailers "if we are a week late we will give you 2 months rent free, if we are 3 weeks late you will get so many months rent free", so there is financial incentive there.

*A
If you had been the initial consultant on this project, this traditional one that had problems, would your system that chooses procurement routes, would it have chosen traditional or design and build? Was it more of a design team problem?

*AL

It was a design team problem, but it was also the client didn't want to use anything but traditional, he wanted cost certainty up front, but he just didn't get it.

*A
You weren't the first so you didn't actually go through that process?

*AL
No

*A
So, you know when you are evaluating these tenders, I'm thinking about the actual tenders that come back, how do you actually evaluate them?
Does it all come down to lowest cost, do you evaluate design?
Do you weight them?

AL
What we will do is look at the designs, the functionality of it, whether or not, I mean you might get a shed, a lot of arty farty stuff, limited parking, you might get some ... it depends, each scheme is individual, the client might stipulate that he wants x number of parking spaces, somebody might give him x, somebody might give him 2 times x and only be fractionally more expensive, we will look at what the building is going to be used for, if its an end user he will be able to tell us what he wants to use it for, and he'll come in and say " I don't like that design, I can't get this lorry in, I can't get this in, I can't do that" and it might be that his employer's requirements he's not been descriptive enough initially, it all comes down to how good the client is and what they can tell us, and sometimes if somebody has got the information available to look at he might not be able to say "oh, I never thought of that, I wouldn't be able to do that" and he might have got site managers, as in warehouse managers who know more about the functionality than what he does, some clients come in with a whole team, they'll come in to us and they'll have right "we've got this warehouse in Bradford, wherever, he manages it, he knows the functionality he'll tell you better what we want" some will just come here and have no idea at all,

do you know what I mean? You can't really pull together anything it doesn't matter what procurement route you go down.

*A

It still comes down to defining your client's requirements?

*AL

Yes

*A

When you do have this bigger team involved do you get better client requirements then?

*AL

Yes

*A

And, therefore, does that lead to a better contractor's proposals?

*AL

Yes and no, it depends. We've just had one tender in and the developer was only interested in cost, he's selling it all on, the contractor's proposals were absolutely rubbish he didn't even say whether he was going to meet with the employer's requirements.

*A

But was this an example of the one where the developer comes in together with a full team?

*AL

No, but he does a lot of what I call inner-city developments in Sheffield and surrounding areas, there's loads round the city centre at the moment, there's one overlooking the Peace Gardens, and that particular development, the contractor that has got that was quite a way lower than any of the others.

*A

Are you saying that developers are more bothered about cost at the end of the day?

*AL

Some are, again it's a mix. I mean Helical are developers, but they deal with the same repetitive clients as in the same end users so they want to provide a quality job to get that repetitive client to come back to them all the time, whereas some clients like this one I've just mentioned - he's never going to sell these on to the same people again and he couldn't give a ... he couldn't care at all really.

*A

You can swear if you want

*AL

Well he couldn't give a toss, to a certain extent he's not that bothered about the standard of workmanship, because we are employer's agent, we are criticising a lot of the workmanship at the moment, the contractor is going straight back to the developer soft-soaping the developer and he's coming back to us and saying "now don't be too hard, don't do this, don't do that" and what we are saying is "yes, but if we don't do it in the future when it all goes wrong and you are getting your complaints from the people that are going to buy it off you, you're going to come back to us then".

*A

Yes, I understand that.

*AL

So we've got a professionalism as everybody else, everybody has got that same ethic, but you can tell there is a difference, I'm not going to call him a cowboy, but all he's interested in is getting it, getting it done, getting his money and moving on to the next one.

*A

Short termism, I am interested in these clients who bring a full team in, these are presumably end users?

*AL

Yes

*A

If you had, let's forget about developers for a moment, any client who's going to be an end-user…

(Participant jumped in and didn't let me finish, but I don't want to stop the flow)

*AL

Take Bingo halls, you know that big Bingo hall?

*A

On the Parkway?

*AL

Yes, they have got them up and down the country, they use (hidden - a small regional professional practice) a lot, they use us a lot, they use (hidden - a large worldwide professional practice) a lot, is it right saying them?

*A

Yes, fine, I'm just looking if its recording that's all

*AL

What happens is that they know what they want and basically they come in and they are like a bit of a whirlwind, I want that, I want this, I want that, here's a set of drawings, this is the same layout that we have had from year dot, so crack on get it done, do you know what I mean? So we know what they want.

*A

Would they bring a full team in? Or are they more looking back at what they have done in the past?

*AL

Everything yes on that side is historical.

*A

And do they tend to be quite prescriptive then?

*AL

They've developed a brief and what they try and do for cost is they know what signs they want do you know what I mean? They've got everything there, the only variables on that is site location, site conditions, whether its Greenfield, whether it is Brownfield.

*A

Because it is so prescriptive then does that tend to be evaluated just on cost or is it all to do with this prequalification as well? (pause)

*AL

Well, on some of them, the easiest way to describe it is the less complex the building the more it comes down to cost (pause) if you've got a building that's got loads of M & E in, but again you see if its got loads of M & E in we wouldn't steer it down design and build, or if it were urgent, a lot depends on when do you want to get on site, when do you need your income, when do you need...

*A

When do you need it turning round?

*AL

Murmur of agreement.

*A

Let’s take this Bingo hall, you go out quite prescriptive, you get a number of bids back, how do you evaluate those?

*AL

First of all we would make sure that they are all willing that the employer’s requirements are going to be met.

*A

Compliance then?

*AL

Yes, we would look at then the overall design, as in have they chosen cheap materials throughout?

*A

So they still get a performance specification then?

*AL

Well, yes and no.

*A

Or is theirs tied up?

*AL

There’s a tied up to a certain extent, but what they try and do is not make it too tied up, but what they will do is they will still say “ideally we want you to use a tin roof”.

*A

So you are saying that they come back and comply with it but offer alternatives?

*AL

Murmur of agreement.

*A

And do they have one price for the compliant and another price showing “if you use these alternatives this is the price you will get?”

*AL

Yes

*A

Right, go on then.

*AL

That happens and then in some instances we get, how can I describe it, let’s stick on the Bingo hall, on the Bingo Hall they want a standard end product that is recognisable whether they are in Sheffield, Birmingham, London, so they don’t try and change it much, but on the same footing they are aware that by using repetitive materials, that suppliers can turn round and say “they are always going to use me” so they will try not to tie it down. Shall we say that they might insist on a quality of external brickwork, that’s got colour, you know they’ll want a certain type, but they are not bothered as long as they meet that criteria.

*A

So in a way then although it is very....

*AL

If they want a red building they are not going to accept a yellow building.

*A

No, although the client will detail the design then there is still a performance element, there is still “we want this, we don’t really care how you meet it, as long as you do meet this performance (AL: yes), this aesthetic need. So you were saying that you would look at compliance, and then you go through the design....

*AL

Compliance, the overall design, we look at, each client is different, we look at access, all them sort of things, they might sound petty, but we’ve got a long list of things to check off to make sure, and then in some instances, say like the Bingo hall, it's got to be easily accessible, it's no good building something and then finding that the surrounding area in the next 2 or 3 years is going to be completely something else (pause). It's like looking a t sometimes we might be asked when the architect is part of the initial design team looking at putting the package together to send out, if you think about the whole ethos of the design and build, the architect is involved from day one, the engineers are involved from day one, now if from them being involved from day one they can't get it right then there is something wrong isn't there? Because they know from the meetings that you have with the client and everybody round the table what is actually wanted, now its how the tendering contractor interprets that and finds ways of generally reducing the cost..

*A

So you are looking for compliance, you are looking at if the design complies as well where differences are allowed (AL: murmur of agreement), and then you look at the price really (AL: murmur of agreement) typically then on this Bingo scheme if you comply, if the client is happy with the way the design has been interpreted, the price is lowest is he the winner?

*AL

Invariably

*A

I know they can't diverge too much in this one, but do you make them know what is important to the client?

*AL

Yes, yes

*A

And is that in the

*AL

Employer's requirements, yes

*A

And it is quite explicitly laid out?

*AL

Yes, the more you can lay that out the less problems you should have on site, because if it is wishy washy then its interpretable in different ways then you are going to get more revisions on site and on a design and build scheme revisions cost you more.

*A

Would you weight all these then on this fairly well detailed design that goes out to tender? Do you weight, do you have a formal weighting evaluation process, or is it more of an intuitive.....

*AL

We have got a weighting system on our internal system, but we use that to open up the informal discussion with the client.

*A

When the tenders have come back, right, so its not a case of you are all sat around and you all give 60% on that, I'm thinking in a fairly well detailed design like this?

*AL

Well on a detailed design like the Bingo hall we don't do it on that

*A

You don't do it on that?

*AL

No

*A

That's fine.

*AL

But what we would do on something that is more open book.

*A

OK that's what I'm interested in, let's forget about the Bingo hall for the time being, let's say that you go out with something that's very loose, for whatever reason, how would you evaluate those designs when they come in?

*AL

Well again, what we would do is look at what the employer's requirements he's given us in the first instance, yes that meets that, that meets that, if you've got 4 or 5 tenders back and everyone met them, we would then look at the cost, and try and interpret what the cost implications were between, shall we say, the lowest 2, ir the lowest 3, to come up with an evaluation of the whole scheme and produce a report on that, as in he's offered more parking places, he's offered easier access, he's offered to put us a junction into the Parkway, he's offered to do this

*A

And would you weight all these things before, like you know access, then aesthetics, functionality, do you sit down with the client and say what is important to you now?

*AL

Well we try and do that beforehand, but if its wishy washy then what we do is we can evaluate on the things that we know are important, we can evaluate on what he's constructed his, I don't know, shall we say that it is in a location in the Outer Hebrides and this guy here has used blue engineering bricks, this guy here has used a wriggly tin porous, you know he's used shit construction, maintenance wise, this blue engineering brick is going to stand up for ever, but this thing here is going to start leaking.

*A

I can understand what you are saying, so there are some things where you want longevity and things like this, how do you actually decide though? Do you see what I am getting at, you have got all these disparate bids that come back, let's say that you have 6 different bids that come back, its very loose, so they can all be quite different, different shape

*AL

Oh they will be they'll be different shapes, different volumes, different you know, so let's say it's a warehouse we might not have put anything in the restrictions that we want a free open space, so somebody might come back with columns everywhere on a grid, and have constructed it on columns, his bid might be £50,000 cheaper than another bid, but you can't then make a recommendation other than make a comment that that ones got the potential to have easy access, to be more flexible, you haven't got columns, but then the clients got to have his input.

*A

I'm thinking about the actual nitty gritty of the process, would you score in this instance?

*AL

Because we are not being like specific, because we are being a bit vague at the moment, it's like until you have sat down and gone through the process from beginning to tender returning you find out during that process what you are looking for, you know what's important.

*A

It's almost like a second definition of the client's requirements isn't it?

*AL

Do you know what I mean so you can look at it and turn round and say "well that is what the client isa looking for" you might go through and you can only tick off and produce like a tender breakdown, a tender analysis is a better description on what you know i.e. you can mark each one out of 10 for 10 things to what was in the employer's requirements, you can either add on things to that that come up through the design process while they are tendering to what the client tells you he wants, but the things that the client has not told you are important you can only comment on, you can't score, you can't say well that L-shaped building is better than that square building if they both meet the volume and area that they wanted.

*A

You can't but would the client?

*AL

Yes the client would.

*A

Who is involved in that process?

*AL

We would, we produce a tender report and a tender analysis, and then once that has been signed off internally what we would generally do is say "right we will send you our report and our analysis, have a read, digest it, come in and see us in 2 day's time and then between us we can make a recommendation, we'll recommend in our report to you" in its caveat saying that "on the information that you have given us, the requirements that you are looking for that's important to you, which are these (participant taps the table with a pen to indicate a list) these are the tenders that we have had back, these are the benefits of each, our recommendation is this, but read the report, come in and see us, there might be things that you are looking for that you have not mentioned, we can then interpret it then, discuss them and then between us we can then recommend" because at that point in time you see we will have had a chat with the...you know we will not tell the architect who is the lowest at that point in time, but we'll have a chat and say like "you know is any of these that are on the list that you don't want to work with, is there any of these that you won't work with". Do you know what I mean? So we'll know all that information, so when the client comes in to see us, initially, we will see them first and say "right this is what's happening, this is what we think, have you got any comments on the report? Yes, right we'll go through all that, over and above that you know the architect doesn't really want to work with Joe Bloggs Limited but he's quite happy working with these" and the client may say "well I don't care a toss, he's a million cheaper, the architect can go and **** himself".

*A

Is that why you don't ask the architect before? (no reply)

(Tape paused owing to coffee being brought)

So, if I can ask you about the people involved in the tender evaluation process, who is involved in the evaluation team?

*AL

The team initially would be ourselves looking at the overall submissions and then do an initial appraisal, send it to the client, meet the client, if the client and us can make a decision, if it was very close and there were pros and cons, then what we would do is get the architects involved and the other designers to then evaluate to a proper answer.

*A

Have you got any recent examples?

*AL

(pause) Sorry, yes, we had one in this year whereby the 2 lowest tenderers were £150 apart and the client in question couldn't decide which he wanted the best, he wanted bits from both and we had a long process, it took about a fortnight to get an answer.

*A

The prequalification and select list process, do you select the contractors who are involved in your tendering process.

*AL

It is a bit of both, some clients come to us and say "this is the 3, this is the 4 contractors I want to use, just get on with it and go out" sometimes they will come in and we will suggest that we could do a tender report.

*A

We are just carrying on with the prequalification and select list process

*AL

Some clients will come in and say " this is the 3 or 4 I want to use and just run with that" sometimes they'll ask us to choose them and we will do a prequalification and well go through all that and get them in, sometimes a client will come to us and say " these are what I want to use" we'll put to them "well are you sure that's what you want to use? Geographically it might not be right, we might suggest you could use 2 of them and 2 that are more local, we might suggest that on the value of the scheme the ones that you are proposing are not big enough or they are too big and you are not going to get your actual right value for money from these contractors. So in that respect we will advise the client and if necessary even if he wants to run with his own we might go through a tender evaluation to make sure that the client is happy with them that he has used a prequalification process because sometimes a client doesn't know what a prequalification involves

*A

Any specific problems related to tender evaluation that you would like to talk about?

*AL

The main problem is when if you like you've got more complex designs, like the example I gave you earlier whereby this year we've had a design and build tender where the lowest 2 were £150 apart. Now to start in detail analysing the design side of things, when our profession is quantity surveyor I think that that is quite difficult

*A

That's a good point, anything else?

*AL

With most things when you get to a certain point in your career you can, you know what's right and what's wrong and you can try and evaluate what clients are looking for and you can do that, but it becomes difficult when you are scrutinizing designs

*A

Are your tender evaluation procedures linked to any current research or best practice?

*AL

Both, we've got an internal system that's called (hidden) Best Practice which is used throughout all the disciplines that we have got within the company, and specifically to CBA there's ongoing research by the company and that, our technical best practice guide gets updated weekly, daily, as and when necessary, and what we actually do is go into the technical best practice system and follow those procedures and if not rigidly then we've got to produce good reasons why we are sort of diversifying from what our best practice guide is telling us to do

*A

So you've got to justify your actions really

*AL

Murmur of agreement

*A

What would you say clients reasons for using design and build are than, if you could bullet point them?

*AL

Generally its time, cost, to a certain extent the same reasons they are going to use these are the reasons for any of the different procurement routes, its just that they become more important, it depends which ones they weight more important than others. But you have to consider time, cost, quality, location, just generally them 4 with other elements that you can glean form the actual client, (pause) going back to that its important to discuss it with the client to find out what is important to him, because by discussing it with him what he thinks is important to him might not actually be important

*A

You know when you said cost did you mean lowest cost or did you mean meeting budget cost?

*AL

Again, some clients will come and they haven't got a budget, they're not bothered. Some clients will come and they have got a set budget to work to

*A

Once these ones who come who haven't got a budget and you've decided on a budget by working through a cost plan, is it then meeting that budget?

*AL

Yes

*A

What I am trying to get at, is there a difference between actual budget and actually getting a lower using design and build? Do you think design and build can lead to a lower cost for a project?

*AL

(pause) again it depends what information you've got upfront, design and build can lead to a cheaper cost, but historically the design and build process means that there is less input early on that you haven't got cost certainty, I'm not saying that it cant lead to a lower cost, because when you take everything into account as in professional fees, responsibility if things go wrong, things like that, all them things can lead to a lower cost, its just that up front the cost certainty isn't there

*A

The cost certainty is there really once the tenders have come in, that's when you've got certainty of cost

*AL

Yes

*A

Right Ok, contractor design ownership; I'm just thinking about sharing contractors designs now, if one contractor say came back with a really good idea, and when you were evaluating the bids, there was another contractor who for some reason you wanted to go with, yet you wanted to involve this very valuable option that the less preferred contractor put forward, is there any type of sharing?

*AL

What we do in our documents at the moment is we write in saying that designs, you know that by tendering we impose it onto the tenderers the fact that design ownership isn't with the architect, but if you think about when its design and build generally the basis of the design is going to be the same because its going to be the same architect that is putting the same design together with X number of contractors

*A

Is it

*AL

Invariably

*A

The same architect?

*AL

What happens with the majority of our schemes is we work with an architect, come up with some designs, those principles get sent out and we generally novate across that architect

*A

Oh, I see, but the different contractors who are bidding wouldn't use the same architect to put their bids together

*AL

No, not necessarily no, but they'd sooner have their own in-house architect or they employ some sort of external consultant, but that external consultant would always have a contract back to the architect that is going to be novated across to the contractor (pause) I mean, I've never, I'm not saying it cant happen, but I've not worked on a design and build scheme where the architect who has been initially involved hasn't been novated across

*A

Right, so they've always been novated ?

*AL

Murmur of agreement, I've not worked on a design and build where it hasn't

*A

So this contractor design ownership would you give them, say one contractor who you wanted to go with, but you wanted to bring that price down a bit, before taking them onboard would you give them chance to re-price using these....

*AL

Depends what form offender you have used, do you know what I mean, you can do that, but it's the way you set out, whether you are using, what

*A

Code of practice?

*AL

Yes

*A

Right Ok, Do you think that design and build adds buildability?

*AL

I do yes, I think it doesn't matter what form of procurement you are using, I mean more and more, you're getting, were getting clients who are wanting to get contractors involved very early on whether its design and build or not, and what more and more clients are looking for in essence is some form of procurement with guaranteed maximum price, with the contractor having gone through an early if you like appraisal with the whole team, get him onboard early, look at the buildabilty, because I think its something wrong with the industry at moment, there's not enough what I would call proper architects. I hate to say this and I m sure that architects would like to criticise quantity surveyors as much as they are going to take my criticism now in that there's too many wishy-washy architects who are really just designers, that don't look at the actual buildability of the scheme at all, and the architects more and more today pass the buildability element onto the structural engineers and more and more structural engineers are belt and braces and what should cost probably £100, invariably costs £250

*AL

So there is no mid-point between the 2?

*AL

No, that's what we think, although we can make suggestions (emphasis on: suggestions) as quantity surveyors saying "this could be done cheaper" because we don't take design responsibility on at the end of the day, because it's the structural engineers PI, invariably what he wants goes, but invariably its belt and braces and you don't need everything that is there, whereas a contractor is more value for money orientated and can force the structural engineer into designing it to the certain tolerances

*A

Do contractors who are tendering for projects, do you believe they employ architects to develop that design or if its left to very small elements like the Bingo Hall and they've got choice over materials and such like do you think they just do it there selves

*AL

They just do it themselves on value, and what they do is they can phone round and say its on masonry, brickwork, they can phone round, the labour is constant, phone round get value into the materials all that meet that specification and then they just choose the cheapest one and invariably they will tie that one down to a long delivery as in whether we want in next month, 6 months or 8 months we want that cost per thousand bricks to remain constant

*A

So you do have examples then, experience of picking projects that are not necessarily the lowest in cost

*AL

Yes

End of Interview

Clients

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Q1 Approximately how many Design and Build (D&B) projects have you procured in the last three years?

Q2 Approximately what is the totai value of all the D&B projects you have procured in the last year ? £

Q3 Does your organisation occupy the buildings you procure?

Yes I No Z Sometimes ***3***

Q4 Are you a property developer who sells on your developments? If

Yes \ No 2- Sometimes | 13

Q5 Are you a property developer who retains your developments?

Yes \ No [^J Z Sometimes [^] 3

Q6 What is your main business activity?

Q7 Do you reduce the amount of design and specification left to the contractor during D&B because your buildings have to fit in with existing stock? <\\

Yes | 11 No | I % Sometimes

Q8 Which five of the following are the most important reasons you think clients use D&B?
Please use the appropriate letter to indicate your choices, where 1 is the most important

Reasons

)A Risk transfer	**%B** Reduced cost	**3C** Convenient
D Single point responsibility	**5E** Innovation	**6F** Short overall time
G Reduced design cost	8 H Certainty of final cost	■I Buildability
'loj Simplified decision making	)(K Short pre-construction time	/ZL Lower consultant cost

1 P 'I
2 f ' 2 I
3 □ c&xO !j
4 L “
5 □ ^ '5 i

Q9^Which one of the following D&B variants do you prefer and which one have you used the most often over the last year?

cfU

Prefer Most used

□' □ >

Virtually no design prior to tender and the design is worked out between you, the client and his consultants

Outline drawings arid mixture of performance and prescriptive specification prior to tender

Very detailed drawings, very firm specification prior to tender

C P

Q11 Who do you usually choose as your first point of contact in a D&B scheme? ^ ll

Architect ☐ ' Contractor ^

Quantity Surveyor ☐ 2 Other - please specify below Q j

Engineer ☐ 3

Q12 Why do you choose the above?

Q13 Overall, what has been your experience of using a novated form of D&B? ^ 13

! Q Very good ZQ] Good J Q Neither good nor poor 4" Q Poor 5" Q Very poor Q N/A

Q14 Do you employ external construction consultants to manage the tender process? ģlif

Yes I No [^] % Sometimes | |3

Q15 Which procurement route would generally best meet your expectations? Q 15

D&B \ Traditional | Ƶ Other (please specify) | |3

Q16 Please indicate your strength of agreement with the following statements:

	Slrjriyly Agree	Ayiee	Neither Ayiee nor Disagree	Disagree	btrongiy Disagree
Contractors' early involvement with a scheme has a beneficial effect	☐	☐	☐	☐	☐
I am confident that the consultants I employ will undertake a best practice tender evaluation	☐	☐	☐	☐	☐ tjILZ
Consultants always discuss the relative advantages and disadvantages of different types of tendering and their potential effects on value attainment	☐	☐	☐	☐	☐

:Q17 Which profession doyou think is best at defining your overall value requirements for a project? Qpf

Architect I Contractor [^ | ^

Quantity Surveyor Other - please specify below [_] 5

Engineer | \3

Q18 Are you personally involved in the evaluation of the contractors proposals? q

Yes Q j Sometimes [^] Z No j

:Q19 Do you believe contractors have enough time to tender for D&B projects? £ 1

Yes Sometimes | |2_ No ☐ 8

Which **one** of the following tendering mechanisms have you used the most over the last year which **one** do you believe offered the best value for you? <^20best ^20•1ost

	Best value	Most used
Open tendering (unlimited tenders)	LJ	1 1
Single stage selective tendering	☐	☐
Two stage selective tendering	☐	☐
Negotiation with a few contractors	☐	☐
Negotiation with one contractor	☐	☐
Partnering strategy	☐	☐
Other (please state)	☐	☐

Q21 Prior to developing the tender documents:

a Do you develop an evaluation method for contractors' tenders based on multiple selection criteria? 0Q_\^	Yes □ i	Go to q20b	a 2 lb
	No □ 2	Go to q21	^22
	Don't know □ 3	Go to q21	QM ,
b Do you make the contractor aware of the selection criteria used? <=2lb	Yes □ I	Go to q20c	<j2lc
	No □ 2	Go to q21	c\22
	Don't know □ 3	Go to q21	on
c Do you make the contractor aware of the relative weight of each selection criterion? 2li	Yes □ I		£ I'p * ,
	No □ 2		
	Don't know □ 3		

Q22 Do you pre-determine which people in the project team will evaluate the contractors' design proposals? q22-

YesQJI Sometimes 2 No| 13

Q23 Would you begin to negotiate with a contractor who produced a non-compliant bid/qualified tender if it was significantly cheaper than the other competitors? ^23

YesQJI Sometimes 2- No| \3

Q24 If a contractor provides an alternative, for example a type of construction or different material after close of tender, that offers an advantage to the tendered solution, would you share it with the winning contractor?

Yes Q]) Sometimes [[^] 2. No | |j

Q25 Do you have any other comments you would like to make?

THANK YOU FOR TAKING THE TIME TO C^tylPLETE THIS QUESTIONNAIRE

PROJECTS

Consultants

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Q1 What was your company's approximate turnover in the last financial year?

Q2 Approximately how many Design and Build (D&B) jobs have your company worked on in the iast year?

\X

Q3 What percentage of the schemes you have worked on have been Design and Build?

% <a3-

G4 Which five of the following are the most important reasons you think clients use D&B?
Please use the appropriate letter to indicate your choices, where 1 is the most important

Reasons

1 □
2 □
3 □ *lqk-S*
4 □ |,V I"
5 □ f c

I **A** Risk transfer	*t* **B** Reduced cost	*3* **C** Convenient
4-D Single point responsibility	5 **E** Innovation	*6***F** Short overall time
G Reduced design cost	*t* **H** Certainty of final cost	} **I** Buildability
J Simplified decision making	*f***K** Short pre-construction time	**L** Lower consultant costs

Q5) Which one of the following D&B variants do you prefer and which one have you used the most often over the last year?

a5J *cpJ-*

	Prefer	**Most used**
. Virtually no design prior to tender and the design is worked out between you, the client and his consultants	□	□
" Outline drawings and mixture of performance and prescriptive specification prior to tender	□	□
< Very detailed drawings, very firm specification prior to tender	□	□

Q6 If your preferred choice is not the same as your most used please explain why.

cj^percc

Q7 Approximately what percentage of the design work is left to the contractor?

%

Q8 Do you feel that you can assess the client's needs better if the 'every day' users of the building are inciuded in the briefing process?

Yas F jj I No SSEPon't know .5

0.9 Prior to developing the tender documents:

a Do you develop an evaluation method for contractors' tenders based on multiple selection criteria?

Yes □ i Go to q9b

No Go to q10

Don't know | | Go to q10

b Do you make the contractor aware of the selection criteria used?

Yes □ i Go to q9c

No *m* Go to q10 %-*n*/a

Don't know Q J Go to q10

Do you make the contractor aware of the relative weight of each selection criterion? ₤c

Yes □ i

No □ i

Q10 Do you pre-determine which people in the project team will evaluate the contractors' design proposals? & |£

Yes Q] \ No Q 2 Don't know [^] 3

Q11 Do you believe contractors have enough time to tender for D & B projects? ^ ^

Yes | \\ No □ Don't know

Which **one** of the following tendering mechanisms have you used the most over the last year which **one** do you believe offered the best value for the client? n

	Best value	**Most used**
Open tendering (unlimited tenders)	\Zi	[H
Single stage selective tendering	□	□
Two stage selective tendering	□	□
Negotiation with a few contractors	□	□
Negotiation with one contractor	□	□
Partnering strategy	□	□
Other (please state)	□	□

Q13 Would you begin to negotiate with a contractor who produced a non-compliant bid/qualified tender if he was significantly cheaper than the other competitors? ^ Q

Yes I Sometimes 2 No [jjj 3

Q14 If a contractor provides an alternative, for example a type of construction or different material after close of tender, that offers an advantage to the tendered solution, would you share it with the winning contractors?

Yes | 11 Sometimes | 12- No | \3

Q15 In addition to a standard tender submission, do you encourage the contractor to submit pre-determined design alternatives? i 15

Yes t Sometimes Q 2 No | 13

Q16 Do you think the pre-qualification of contractors is generally a useful exercise? ^ ii>

Yes (Sometimes [^J 2 No 3

Q17 Approximately what percentage of D&B schemes you are involved with use a novated architect? %

Q18 At the post-contract stage, do you believe a novated architect still has allegiance to the client? !o

Yes \ Sometimes Q X No Q] J

Q19 Does this cause you any problems? T! 1

Yes Q \ Sometimes Q] 2 No Q] 3

Q20 Do you have any other comments you would like to make?

THANK YOU FOR TAKING THE TIME TO COMPLETE THIS QUESTIONNAIRE

PROJECTS

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Contractors

For office use only

Q1 What was your company's approximate turnover in the last financial year?

Q2 Approximately how many Design and Build (D&B) jobs has your company worked on in the last year?

6(2

i

; Q3 What percentage of the schemes you have worked on in the last year have been Design and Build?

I

t

t

Q4 Which five of the following are the most important reasons you think clients use D&B? *Please use the appropriate letter to indicate your choices, where 1 is the most imDortant*

Reasons

i \A **Risk transfer** 5-B **Reduced cost** 3 C **Convenient**

: D **Single point responsibility** E **Innovation** 6 F **Short overall time**

I?G **Reduced design cost** §H **Certainty of final cost** : I **Buildability**

J **Simplified decision making** l(K **Short pre-construction** time '2-L **Lower consultant costs**

1

2 ☐ I

3 ☐ \HU

4 ☐ I/*-

5 ☐ , 1.-0

Q5 Do you employ your own full-time, permanent, design staff for D & B projects? ǵ0

Yes □ I

No, we have never employed them Q z

We used to, but no longer employ them □ 3

Q6 Can you explain why?

Q7 Do you think there has been a movement over the last decade away from contractor designed D & B towards a more client designed approach?

Yes [] **N o P] X** **Don't know Q**

Q8/ Which one of the following D&B variants do you prefer and which one have you used the
y most often over the last year?

	sjS-l Prefer	s 0 Most used
3 **Virtually no design prior to tender and the design is worked out between you, the client and his consultants**	☐	☐
« ^ **Outline drawings and mixture of performance and prescriptive specification prior to tender**	☐	☐
3 **Very detailed drawings, very firm specification prior to tender**	☐	☐

Q9 If your preferred choice is not the same as your most used please explain why.

Q10 If you find discrepancies with the tender document during the tender period, which course of action are you most likely to adopt? *n* ,

Inform clients/consultants at tender stage	☐ i
Inform client/consultants in your contractor's proposals	☐ 2
Inform client/consultants during construction phases	☐ 3
Do nothing	☐ i
Other (please state)	☐ 5

Q11 Are you concerned about liaising with the client and his consultants at tender stage in case your designs, options or ways of working are passed on to other contractors? *a jj* 1

I I Yes (Go to q 12) *Z* Q Depends on client (Go to q 12) ***3*** Q No (Go to q 13)

Q12 What strategies do you employ to prevent your design ideas from being disseminated onto the market place? ^

j Q13 Which one of the following tendering mechanisms have you used the most over the last year and **which one do you believe offered the best value for the client?** ^13bed:

		Most used	Best value
\	Open tendering (unlimited tenders)	□	□
2	Single stage selective tendering	□	□
3	Two stage selective tendering	□	□
If	Negotiation with a few contractors	□	□
5	Negotiation with one contractor	□	□
t>	Partnering strategy	□	□
	Other (please state)	□	□

Q14 Have you ever won a project despite not being the cheapest tenderer?

I □ Yes (Go to Q15) Z □ No (Go to Q16)

Q15 What reasons, if any, were you given for being awarded the contract?

Q16 Do you believe you are given enough time to tender for D& B projects? fe

I Q Yes (Go to Q18) Sometimes (Go to Q17) 3 Q No (Go to Q17)

Q17 Where you believe the tender time is not sufficient, and request an extension from the client, what response do you normally get from them? C

Q18 When approaching the client's architect for information at tender stage, what sort of response do you receive? j

		Very helpful	Helpful	Neither helpful nor unhelpful	Unhelpful v	Very unhelpful	
Q^	a. On a novated contract	□ '	D 2-	□ 3		, □ 5	I 1
^	b. On a non-novated contract	□ '	O	□ 3	O	□ 5	1

Q19 How often do you employ the services of an architect to develop the design for tender purpose? Q

I □ Always (Go to Q20) Z □ Sometimes (Go to Q20) 3 EH Never (Go to Q21)

Q20 When you employ an architect to develop your tender do you allow them to liaise directly with the principle building client?

\ LH Always 3 □ Sometimes 3 □ Never ¥(-*1/4.

Q21 On highly specified D&B schemes contractors have less opportunity to develop design details in the post contract period. Do you include an additional risk premium on this type of highly specified scheme

a i\

\ I H Always □ Sometimes 3 □ Never

Q22 Occasionally D&B contractors offer alternative designs/materials to clients at tender stage. Do you offer alternatives to the client with D&B tenders?

I □ Always (Go to Q23) 1 EH Sometimes (Go to Q23) 3 EH Never (Go to Q24)

Q23 When you offer alternatives, do you think they help you win jobs? q

\ □ Yes 1 EH No 3 EH Don't know

Q24 Do you think the pre-qualification of contractors is generally a useful exercise?

I □ Yes 2 EH No EH Don't know

Q25 Approximately what percentage of D&B schemes you are involved with use a novated architect? % 25

Q26 When you are tendering for a novated project, how often do you employ your own architect to attempt to improve the clients design? <^26

Always	Frequently	Sometimes	Seldom	Never
□ i	□ 2	□ 3	□	□ 5

Q27 In the post-contract stage, do you believe a novated architect still has allegiance to the client? a

\ □ Yes X □ No 3 EH Don't know

Q28 Does this cause you any problems?

1 □ Yes □ No 3 EH Don't know

Q29 About what percentage of the design work is left to the contractor on a typical D&B job? **21**

| Q30 During the design period are you made aware of

a. the selection criteria the client used to assess your bid?

\ / 3 7

I 1Yes (Go to Q30b) Q Sometime (Go to Q30b) Q No (Go to Q31) q

b. the weights he assigns to each selection criterion?

I 1 3

I I Yes Q Sometimes Q No ci

Q31 In addition to your standard tender submission does the client direct you into pre-determined design alternatives? c|3|

I Q Yes %O No 3 [ ] Don't know

Q32 Irrespective of your responses to the above, do you investigate your own design, time and specification alternatives?

I []] Yes X □ Sometimes J Q No

Q33 Do you have any other comments you would like to make?

THANK YOU FOR TAKING THE TIME TO COMPLETE THIS QUESTIONNAIRE