



**AN EVALUATION OF PERFORMANCE
IMPROVEMENT WITHIN PUBLIC SECTOR
CONSTRUCTION FRAMEWORK AGREEMENTS**

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A thesis in partial fulfilment of the
requirements of Anglia Ruskin University
for the degree of Professional Doctorate (DProf)

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The completion of this thesis has been a significant undertaking, but is in reality a culmination of several events that coincide in space and time at this particular moment in 2013 Anno Domini (Gregorian), 4710 Xin Mao (Chinese), 1434 Hijri (Islamic). On a personal level, it is a long way from the sixteen year old in September 1973, who stepped nervously onto a construction site at Exeter Devon, as a trainee quantity surveyor to measure a line of storm water drainage. In many ways, the inquisitive person then is the same one writing this – the only real difference is knowledge and experience – but hopefully the logical thought process that stems from professional training has honed this thesis into something slightly worthy. So the first acknowledgment is to the construction industry and my initial profession (quantity surveying). It is a wonderful industry, where focused and skilled people come together to produce tangible objects – buildings, bridges, highways and all manner of projects which define our species as civilised – many of which will last well beyond our own individual lives.

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Life is a risk and we have to ride these risks in order to gain rewards. I leave you with an extract from a song that places this in context far better than I. This song has followed me since 1976 and was written by Donald Roeser:

Moderate Rock $\text{♩} = 144$

Intro Rhy. Fig. 1 (Doubled by 2nd gtr. 2nd, 3rd, 4th times)

Am G F G Play 4 times

mf sustain all notes

1st Verse

Repeat Rhy. Fig. 1 (4 times)

Am G⁺ F G⁺ Am G⁺ F G⁺ Am G

All our times have... come... Here, but now...

F G Am G F G F5 G5 *sl* *sl*

they're... gone... Sea-sons don't fear the reap-

A5 F5 E5 A5 G5 E^{open} 2nd half of Rhy. Fig. 1

er, nor do the wind, the sun or the rain... We can be like they... are. Come on, ba-

Rhy. Fig. 1 (8 times)

Am G F G Am G F G

by. Don't fear the reap-er, Ba-by, take my hand... don't fear the reap-er, We'll be a-ble to fly...

ANGLIA RUSKIN UNIVERSITY

FACULTY OF SCIENCE AND TECHNOLOGY

PROFESSIONAL DOCTORATE

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ABSTRACT

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Context of this research

The construction industry has a history of client dissatisfaction in the UK. In response, framework agreements have been developed to create relationships between suppliers and clients in order to improve project performance. This research aims to assess whether use of framework agreements can result in significant improvement for performance outcomes without a significant increase in costs when compared with traditional discrete methods, and if so, develop a procurement performance model for realisation and continuous improvement in performance.

Research methodology

A literal review of UK Government reports with economic and performance management theories precede a case study set within Hampshire County Council, a major public sector authority, allowing analysis of data from 164 highway maintenance projects by independent-samples t-tests. Projects are divided into discrete and framework groups using critical success factors to measure performance differences. In addition to project outcomes, a review of economic performance was undertaken to advance a current 'gap in professional knowledge' concerning cost effectiveness of framework agreements. A performance management model is proposed representing impact of operational measures and sociological behaviour factors on suppliers' performance, tested by qualitative views of experienced practitioners collected through a questionnaire survey and in-depth interviews.

Key findings

Independent-samples t-tests proved that there were significant improvements in performance with use of framework agreements, but that no significant additional costs were incurred. Factor analysis and central tendency statistics from questionnaires and node values from interview transcripts confirmed long-term relationships, financial and non-financial incentives and stronger communication were sociological behaviour factors driving performance for framework agreements.

Conclusions from the evidence and findings

As framework agreements can achieve significant performance improvements without a significant increase in costs, this study supports use of framework agreements for Hampshire County Council and professional practice. Value of this research is recognised by both central government and case study organisation alike. In respect of the latter context, case study findings have been included within a regional framework for use by South East authorities until 2016. It is recommended further studies should be conducted on civil and building projects in wider public and private sectors so that construction clients can make informed decisions based upon generalised findings.

Key words: Public sector, construction frameworks, performance, drivers

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CHAPTER 1: INTRODUCTION AND CONTEXT

1.1 Context of thesis

The Professional Doctorate (DProf) is described as an “*an award at a doctorate level where the field of study is a professional discipline and which is distinguished from the PhD, by a title that refers to that profession*” (Powell & Long, 2005). Whereas a Philosophiae Doctor (PhD) features a contribution to knowledge, a Professional Doctorate seeks to advance knowledge and professional practice. The Council for Graduate Education reinforces the vocational nature of a DProf by describing the professional doctorate as “*a programme of advanced study and research which, while satisfying the University criteria for the award for doctorate, is designed to meet the specific needs of a professional group external to the University, and which develops the capacity of individuals to work within a professional context*” (UKCGE 2002:62). The relevance of research directed towards solving problems encountered in the built environment is significant to this thesis which undertakes an examination of contemporary procurement custom and integrates this with published theory to understand practices and procedures. An addition to tacit experience within a profession by discovering practical solutions to real life problems is an approach to which this research seeks to provide a contribution to knowledge. Results from this research anticipates a significant increase in existing knowledge of the interaction, operation and motivational aspects of construction frameworks, thereby ‘making a difference’ as described by Middlewood *et al* (1999).

1.2 Definitions and contextual positioning of terms used within this research

The research examines a selected construction framework being used by a public sector local government authority in order to discover which motivational drivers between participants are being displayed and the encouragement and incentives being deployed in order to increase outcome performance of infrastructure construction projects. Within this thesis and context the following definitions are used:

1.2.1 Organisation

When referred to within the case study context, the organisation is Hampshire County Council, a local authority located in the South East of England which includes the historical cities of Winchester, Southampton and Portsmouth. The organisation has a significant capital programme and is seen by Central UK Government as a lead local authority in the role of public sector procurement. The case study organisation is an employer, but individuals within the organisation may also be designers and supervisors.

1.2.2 Suppliers

Suppliers for construction services are traditionally known within the construction industry as contractors. This refers to the primary contractual arrangement made between one organisation whose role is to provide and organise resources to construct a project (supplier) and another organisation which shows financial consideration through monetary payment for the completed project (employer). Modern construction is an extremely complex operation and the traditional role of contractor has expanded to encompass other considerations during and following the construction process. Suppliers have to be more than mere facilitators of resources in order to supply construction services – an awareness of the environment within which operations are undertaken and the effect upon third parties remote from the construction process is often necessary.

Definition for suppliers also includes attributes assigned by conditions of contract under which such organisations are engaged. The New Engineering Contract 3rd Edition (NEC, 2005) form of contract – defines suppliers within a framework agreement as *Suppliers* whereas the same organisation selected to construct a project will become a *Contractor*. This deliberate distinction alludes an inference that services are offered by a *Supplier* at framework level whereas compliance with the more rigorous parameters of a project is undertaken by a *Contractor*. This distinction is reflected by appropriate use of the term within the thesis although to a certain extent, ignoring legal connotations, the term supplier or contractor is interchangeable.

All suppliers providing data for this thesis are established construction companies with experience of working for a public sector employer. In addition, requirements of financial stability, technical expertise and relevant resources are minimum standards set to gain a place on a select list of tenderers for all projects contained within this research.

1.2.3 Sociological group participants

Participants to construction projects comprise unrelated individuals coming together for mutual goal objectives and these follow social convention and general principles for cohesion/interpersonal interdependence suggested by Hogg (1992). Practitioners generally conform to a theory of ‘group cohesiveness,’ defined by Festinger, Schachter and Back (1950) and this is demonstrated through professional allegiance aligned with member community and group standards. Construction management professionals align with a technical/social class determined by codes of conduct, standards and technological language (Oakley, 1994). This research is set within a paradigm of construction management and theories related to behaviour characteristics are those specifically relevant to professions set within a background of Western European culture.

1.2.4 Traditional (or discrete) procurement arrangements

A procurement arrangement is designed to *‘ensure that the built structure or facility fully meets the client’s requirements with regard to quality, functionality and performance in a cost effective and efficient manner’* (CIRC 2001). In fulfilment of this function, procurement involves the *‘process of acquiring new services or products and includes contract strategy, contract documentation and contractor selection’* (Bower, 2003). Procurement arrangements within the public sector display a number of characteristics that reflect a regulated engagement and selection processes. These arise through requirements of accountability, fairness and transparency embodied within statutory legislation and organisational Standing Orders.

Further clarification of the definition of 'traditional procurement' within a public sector environment is provided by the following characteristics applicable to projects referred to as **traditional** or **discrete** projects:

- A design phase, which is separated from the construction phase. Designs are undertaken by the employer's professional advisors to standard details required by the organisation. Examination of performance within this thesis commences at tender selection phase.
- A discrete tender process is employed for each project defined as traditional or discrete.
- Selection of a supplier to undertake a project is undertaken from an extensive list of approved suppliers. Although prior performance is not a criterion for selection, minimum standards of stability, expertise and resource ensure that all suppliers are competent in the field of construction.
- Selection of a supplier to undertake a project follows either a 'lowest price wins' or 'best aggregation of price and quality' according to the published instructions for tendering. The predominant form of selection within public sector procurement, reflected by this research is that of 'lowest price wins'.
- A supplier is engaged using a single agreement between the employer and contractor. All projects within this case study use the NEC3 Engineering and Construction Contract.
- Although use of key performance indicators may be employed during the construction phase of discrete projects, performance outcomes have no effect upon selection of suppliers for a future project.

The latter clarification – where no connection is made between success of a finished project and choice of supplier for a future one - is a particular requirement with traditional public sector procurement. UK legislation enacted through the Public Contracts Regulations 2006, and EU Directive 2004/18/EC of the European Parliament of the Council of 31 March 2004 prevents use of historical performance information as a selection criterion in discrete tender lists. Inappropriate use of such criteria by a public sector organisation can be challenged by aggrieved suppliers through the Remedies Directive (2007/66/EC) and this has also been supported in

non-European examples through the UK courts by relevant case law. Each procurement exercise in a discrete procurement situation has to be conducted without influence that benefits or prevents selection of a supplier reflecting prior performance. Although such arrangements are often referred to as ‘traditional’ by practitioners, this can encompass a number of variables within the engagement process. In order to distinguish the independence with projects contained within this study, the term discrete is used.

1.2.5 Framework agreement

A framework agreement is an ‘umbrella agreement’ that sets out principle terms (such as elements of price, quality and scope) under which individual call off contracts can be made throughout the period of the agreement. The framework is an agreement between a single employer (or several employers grouped together as a recognised organisation) and multiple individual suppliers engaged to provide services within a specified scope. Characteristics applicable to the framework agreement are:

- A design phase, which is separated from the construction phase as for discrete projects.
- A tender process to identify suppliers to a framework.
- A ‘mini-competition’ within the framework to select suppliers for a project.
- Selection of a supplier to undertake a project follows either a ‘lowest price wins’ or ‘best aggregation of price and quality’ according to the rules of the framework, including key performance indicators of past performance.
- Suppliers are engaged by a framework contract which is separate to those for individual projects. A supplier is engaged to a project within this case study by a NEC3 Engineering and Construction Contract.
- Key performance indicators are used within the framework agreement and can affect choice of supplier for a project.

The framework agreement states how individual call off contracts are managed, selected and organised and defines duties and liabilities of each party to the agreement. There is usually no requirement upon an employer to place a minimum number or any value or call off contracts within the agreement. Therefore

commercial attractiveness of frameworks to suppliers is dependant upon throughput of projects to become viable. Within current European procurement regulations, a public sector framework agreement should not exceed a period of 4 years, unless considered exceptional due to the extent or nature of service required.

Contextual placement of framework agreement projects within this case study is through infrastructure civil engineering construction works initiated by Hampshire County Council commencing in May 2008.

Framework agreement projects are often described as collaborative by practitioners because an implied relationship is assumed between participants. This has not been assumed at the outset of this study – until discovered otherwise. Therefore the term framework or framework agreement is used to provide distinction from other forms of collaboration.

1.2.6 Performance

Performance within the context of this thesis is expressed as “*an aggregate of behaviours over time, tasks or people*” (Mitchell, 1983). Although the expression includes subjective terms to judge performance, Szilagyi (1988) expanded the definition of performance by introducing objective criteria for evaluation of the measure of success. Szilagyi’s model collates data from a number of sources to build towards the aggregated definition suggested by Mitchell. Within this thesis the sources include:

- Measuring performance against well defined goals.
- A detailed description of how performance will be measured and which units are used for measurement.
- Measurement should be compiled by engaging a number of structures – from individuals, from organisations, from stakeholders.
- The use of time periods to create active performance for comparison.
- An overall assessment being compiled from a matrix of selected measured scores.

The case study details specific measures of performance through key performance indicators and project outcomes from projects.

1.2.7 Geared performance management model

To assist with understanding of internal and external factors and processes involved in managing resources a performance management model is constructed to provide a graphical representation for this research. Details of elements used to construct the model are defined with the analysis, but a particular characteristic of this model is with the rotation assigned. The allocation of a term ‘geared’ to the proposed model arises from a number of sources. Gearing refers to the co-operation between elements of the model which combine in a pseudo-mechanical fashion (OED, 2007: *apparatus for transmission of motion or power*) where the elements integrate to determine performance outcomes. Gearing also refers to a financial usage of the term because it parallels a return of performance against the investment of resources invested (OED, 2007: *potential short term returns proportionate against long term assets*). The geared model operates in a ratchet fashion because rotation is only traversed through a single direction.

1.3 Problem statement and purpose of this research

Construction of dwellings, buildings, monuments and infrastructure is one of the most fundamental requirements of human existence and is often used to describe civilisation through the use of technological capability by the management of materials and techniques. As construction methods develop, those who use the products of construction demand every increasingly higher standards of performance. In the daily lives of ordinary people going about their business there is an expectation from consumers (clients) of construction products (projects) which match those in line with other industries for consumable goods. Comparisons are made by clients between the construction industry, with examples of progression made in automotive and aerospace engineering industries, regarding performance outcomes in terms of cost, quality and time. The perceived lack of effective organisation and management of resources with the construction management process has traditionally attracted criticism from project sponsors and financiers. This is particularly pertinent where public finance is involved due to transparency of costs which allow challenges to be made in the political arena concerning value for money.

Criticism of the construction industry concerning over run of programme completion dates, increases in costs and defects with the finished product are not new. Public sector organisations, especially central government authorities, have been critical of performance with the construction industry within the United Kingdom since the end of the Second World War. Each successive government has produced regular reports voicing concerns with projects and the organisation process over the last six decades with similar themes of criticisms arising. Although focus of the construction process is aimed toward suppliers (contractors), many reports also recognise the roles that clients provide and the influence upon project outcomes this can have.

In response to the reports, those involved with the construction process (suppliers, designers, supervisors and managers), encouraged by government initiatives sought to evolve procurement and engagement methods that reflected those of manufacturing industries – namely longer term relationships between parties together with establishment of rewards in return for higher levels of performance. Such rewards are not necessarily financial but can be the offer of an opportunity for future work. This proposition provided the basis upon which construction framework agreements were developed through professional practice during the mid 2000's. A limited number of selected suppliers are chosen to provide exclusive delivery of projects over a fixed term. In accordance with public sector procurement legislation, framework agreements are usually of four years duration and offer an opportunity to provide a balanced and continual workload for suppliers in return for improvements in project performance.

Although a significant number of frameworks are now in operation, very little research has been discovered which examines performance outcomes and contrasts these with traditional discreet methods of supplier engagement. This represents a significant gap in professional knowledge because at the date of this thesis, framework agreements in one form or another are used to deliver a significant value of publicly funded projects within the United Kingdom. It is estimated that approximately 70% of all local authority construction projects are procured using a framework process and that this represents around £28.7 billion out of a total construction expenditure of £41 billion per annum (Local Government Task Force, 2007, p 3).

1.4 Aim and Objectives of this research

The aim of this study is to assess whether the use of framework agreements for construction projects can result in significant improvement with performance outcomes when compared to engagement and management of suppliers with traditional discrete arrangements without a significant increase in cost, and if this is recognised, develop a procurement performance model to ensure continuous improvement in performance outcomes can be achieved without a significant increase in costs. A controlled case study method is used to measure the effects and assess differences between the two procurement systems. In particular, the objectives of this research will consider specific elements of performance as follows:

- investigate if construction project outcomes differ between the two methods of procurement.
- determine if any variance exists between production and transaction (engagement and performance monitoring) costs for projects procured within framework agreements and those engaged through traditional procurement.
- establish the performance drivers within the procurement process in order to develop a procurement performance model to ensure continuous improvement in performance with the engagement and construction stages of a framework agreement.

1.5 Relevance of this research to professional practice and the UK construction industry

The construction industry is a significant contributor to the economy of the United Kingdom. In 2010, the Gross Value Added (GVA) of the construction industry was estimated to be £110 billion and this represented 6.8% of the total GVA of the UK (ONS, 2010). Gross Value Added is a measure of actual 'added value' of the industry and excludes intermediate industry effects, taxes or subsidiaries on products. 2.11 million workforce jobs are provided by the industry at March 2011 – accounting for 6.7% of all workforce jobs for the UK (ONS, 2011). Of the total estimated value of the industry, £41 billion is financed by the public sector (representing 37% of all

construction expenditure) and this is broken down into the follow proportions: Commercial and Social £20 billion, residential £14 billion and infrastructure £7 billion. Recognition by the Government of the important contribution the industry makes is contained with the *Government Construction Strategy* (Cabinet Office, 2011). The focus of this strategy is to reduce construction costs by up to 20% through innovative procurement and engagement methods. Use of frameworks as one method to deliver such savings is recognised by the strategy and the use of this engagement method is specifically mentioned. Paragraph 2.38 provides a specific acknowledgment of success achieved so far, but this is tempered with caution by recognising that there is *'highly effective use of frameworks, but also to other frameworks which are less effective'*. To combat the latter issue, establishment of cost benchmarking to provide a consistent value for money programme is suggested. The report places development of suitable mechanisms for benchmarking and cost evaluation with the professions, where standards can be proposed and adopted by members and instigated for both public and private sector clients alike. Recognition of the latter evolutionary procedures includes proposals for formation of a Construction Client Board to determine Construction Standards for the sector. Comprising representatives from Government departments, private sector organisations and leading construction professions, the board will investigate procurement and engagement methods as initial steps towards achieving goals.

Reaction from professionals in the industry to the Government Construction Strategy has been positive with full support being given by members of the Construction Industry Council on 9 June 2011 (CIC, 2011). Statements made by leaders of professional groups at that time – Royal Institute of British Architects President Ruth Reed, Chartered Institute of Building Chief Executive Chris Blythe and Royal Institution of Chartered Surveyors Director of Practice Gary Strong, have all welcomed the value for money approach offered by the new objectives. There are however concerns with a focus on cost to the detriment of other outcomes for a project. David Bucknall, chairman of the RICS Quantity Surveying and Construction Professional Group Board remarked that *'sub economic bidding is the old model; we need to move towards early collaboration and integrated bidding by the whole supply chain.....if we change and integrate the way we procure construction work, then we can mitigate and in due course eradicate sub economic tendering and still get maximum value for money'* (RICS, 2011a).

Current professional practice regarding procurement of construction projects places use of frameworks at the centre of the strategy, but some individuals that warn of concerns over usage regarding value for money and restrictions placed by frameworks with engagement of new suppliers. Use of incentives and long term relationships offered by frameworks are used to encourage performance and these topics offer debate by clients and professions to the industry. Although anecdotal claims for improvement in performance are made, research reflecting the outcomes of projects included within a framework agreement is limited. This research aims to gather evidence from a case study to analyse the effectiveness or otherwise of a framework agreement and to propose a performance model that is relevant to professional practice.

The case study for this research is embedded within the infrastructure delivery department of a large local public sector authority. Findings from this research are expected to be of interest to all public sector organisations that propose engaging suppliers through use of a framework agreement method of construction management. In order to provide a link between this research and that of Central Government, an interim summary paper was produced in October 2010 which analysed initial findings of a pilot study. Appendix 7: *Reaction from Central Government towards this research* contains letters received from two Ministers of Parliament including the Minister of State for Construction and Enterprise in support of findings concluded at that stage and confirmed the importance of this research. In addition, a number of published papers placed with professional bodies and presented during academic conferences notifying findings during the research process are referenced later in this thesis.

1.6 Background to the research

The research uses project outcomes as a measure of performance to develop a management model to encourage further improvements in the effective delivery of projects. Interest with performance of the construction industry in the recent era was initiated through executive summaries and commentary contained in two significant UK government reports – *Constructing the Team* (Latham, 1994) and *Rethinking Construction* (Egan, 1998). Criticism of performance with the construction industry was not new, even at during the 1990's. It had been voiced for over six decades prior

to this through regular UK central government reports outlining various issues but predominantly concerned with outcomes of construction projects, either during or upon completion. Arranged chronologically, the fifteen significant reports are:

- 1 Report of the Central Council for Works and Buildings chaired by Sir Ernest Simon: The Placing and Management of Building Contracts (Simon, 1944)
- 2 The Working Party Report to the Minister of Works: The Phillips Report on Building (Phillips, 1950)
- 3 Survey of Problems Before the Construction Industries: A Report prepared by Sir Harold Emmerson (Emmerson, 1962)
- 4 Report of the Committee on the Placing and Management of Contracts for Building and Civil Engineering Work chaired by Sir Harold Banwell (Banwell, 1964)
- 5 The Public Client and the Construction Industries: The Wood Report (Wood, 1975)
- 6 Faster Building for Industry: NEDO (1983)
- 7 Faster Building for Commerce: NEDO (1988)
- 8 Constructing the Team by Sir Michael Latham: Final Report of the Government/Industry Review of Procurement and Contractual Arrangements in the UK Construction Industry (Latham, 1994)
- 9 The Levene Efficiency Scrutiny into Construction Procurement by Government (Levene, 1995)
- 10 Rethinking Construction by Sir John Egan: Department of Trade and Industry Construction Task Force (Egan, 1998)
- 11 Achieving Excellence (Office of Government Commerce, 1999)
- 12 Modernising Construction by the National Audit Office (National Audit Office, 2001)
- 13 Improving Public Services through better construction by the National Audit Office (National Audit Office, 2005)
- 14 Construction Matters (Business and Enterprise Committee, 2008)
- 15 Government Construction Strategy (Cabinet Office, 2011)

In order to recognise objectives and the emphasis from each report, a brief examination has been undertaken by summarising comments made by the respective author(s) or compilers taken from their conclusions or an executive summary. Table 1.1 lists these reports in chronological order together with an objective viewpoint which reflects contextual positioning and the predominant topic of the construction industry each report referred to. Following each objective, an emphasis is arrived from summation of the recommendations made by author(s). The summation reflects emphasis related toward performance in construction projects through examination of economic pressures (pricing structures), productivity, standardisation, relationships and the like which are stated by the report to affect project outcomes. Encapsulation of ideological concepts also reflects predominant views and concerns made at the time of publication, set against an environmental background of the public sector and political importance.

Table 1.1: A summary of objectives and the emphasis from UK government reports on construction 1944 – 2011

Report	Objective	Emphasis
Placing of Public Contracts (1944)	Standardisation of public sector contract management	Less onerous tendering processes and emphasis on lowest price
Working Party Report (1950)	Standardisation and efficiency of the industry from a supply perspective	Higher performance from contractors and labour productivity
Problems before the Construction Industries (1962)	Closer links between designers and constructors	Higher standards of design information, even supply of workload, less emphasis on lowest price
Placing and Management of Contracts (1964)	Improvement of the design and management of construction projects	Standardisation of management processes, use of negotiated tenders
Public Client and Construction Industries (1975)	Aggregation of projects to provide regular work load	Continuous work load and less competitive tendering
Faster Building (1983)	Increase in productivity for large warehouses and industrial projects	Use of 'off site' manufacturing techniques, construction management and elemental package processes
Faster Building (1988)	Increase in productivity for offices and commercial projects	Similar emphasis from the 1983 report
Constructing the Team (1994)	Looks at relationships between parties to a construction contract	Recognises a larger role for Clients and the importance of financial liquidity
Efficiency Scrutiny (1995)	Improving communication, training and a single contact for disputes	Recognises government as a change catalyst to create the improvements required
Rethinking Construction (1998)	Improvement in performance and productivity of construction	Compares construction with manufacturing, identified five drivers for change
Achieving Excellence (1999)	Awarding contracts by the use of value for money rather than lowest price bid	Recognises the weaknesses of government procurement rules
Modernising Construction (2001)	Strong partnering approach to projects, long term relationships	Selection of parties by best value rather than lowest price, less adversarial approach
Improving Public Services (2005)	Places construction as a key driver for delivery of public services	Looks toward creation of long term relationships for improvements in performance
Construction Matters (2008)	Requests demonstration of the construction industry's strengths and areas for need for improvement	Outlined the need for government leadership at strategic and operational levels
Government Construction Strategy (2011)	Deliver a competitive industry for the future, cost savings through efficient procurement	Cost benchmarking, standardisation and justification of value for money

A review of the objectives and emphasis in Table 1.1 reveals a number of recurring themes and common fundamental concerns that, according to the authors, need to be addressed in order to achieve improvement in performance from the construction industry. One consistent view which spans the whole time period involves selection of suppliers on price alone. The Simon Report in 1944 recognised problems with

accepting the lowest price due to the potential for suppliers to ‘underbid’ and then either cut corners in terms of specification, or try and maximise income by claiming additional monies. This specific concern was highlighted exactly fifty years later by Latham (1994, p2). Latham stated:

‘Many clients still do not understand that fiercely competitive tenders and accepting the lowest bid do not provide value for money in construction. Lowest priced tenders may well contain no margin of profit for the contractor, whose commercial response is then to try to claw back the margins through variations, claims.....’

A second theme which arises is through the numerous and varied use of different controls and information during the construction phase of a project. It is acknowledged that projects, by their nature, are unique in terms of location, design, form and function. Although variables will always exist to an extent, the reports recognised that inefficiencies were introduced through the management process. This second theme proposed that standardisation of components, management controls and engagement of suppliers and sub-contractors using standard forms of contract will drive out wastage and uncertainty. The proposal of standardisation would apply to all elements of a project – and to all parties - clients, suppliers and designers. In the Simon Report (1944, p 21) it was specifically recognised that:

“it has become impossible for any single Architect or Builder to have specialist knowledge and experience to deal effectively with all the new processes..... as a result specialist firms are operating on a substantial scale engaged under differing terms and conditions and to differing standards.”

A third area of commonality and potential efficiency contained in the reports recognised benefits accrued from a reliable and stable continuous workload. A cycle of ‘boom and bust’ does not encourage efficient and effective long term planning of resources. Training programmes, procurement systems and standard legal documentation require introduction and development over long time scales. Fluctuating economic conditions make continuous long term investment in training and development extremely difficult for suppliers and clients alike.

The earlier reports focus upon a steady volume of work through economic stability achieved by consistent spending patterns of public authorities and therefore place a significant responsibility with politicians. Latter reports recognise financial contributions from both private and public sectors and highlight the importance of long term relationships between suppliers and clients so that financial variances with organisations align.

Timeline of Significant UK Construction Industry Reports

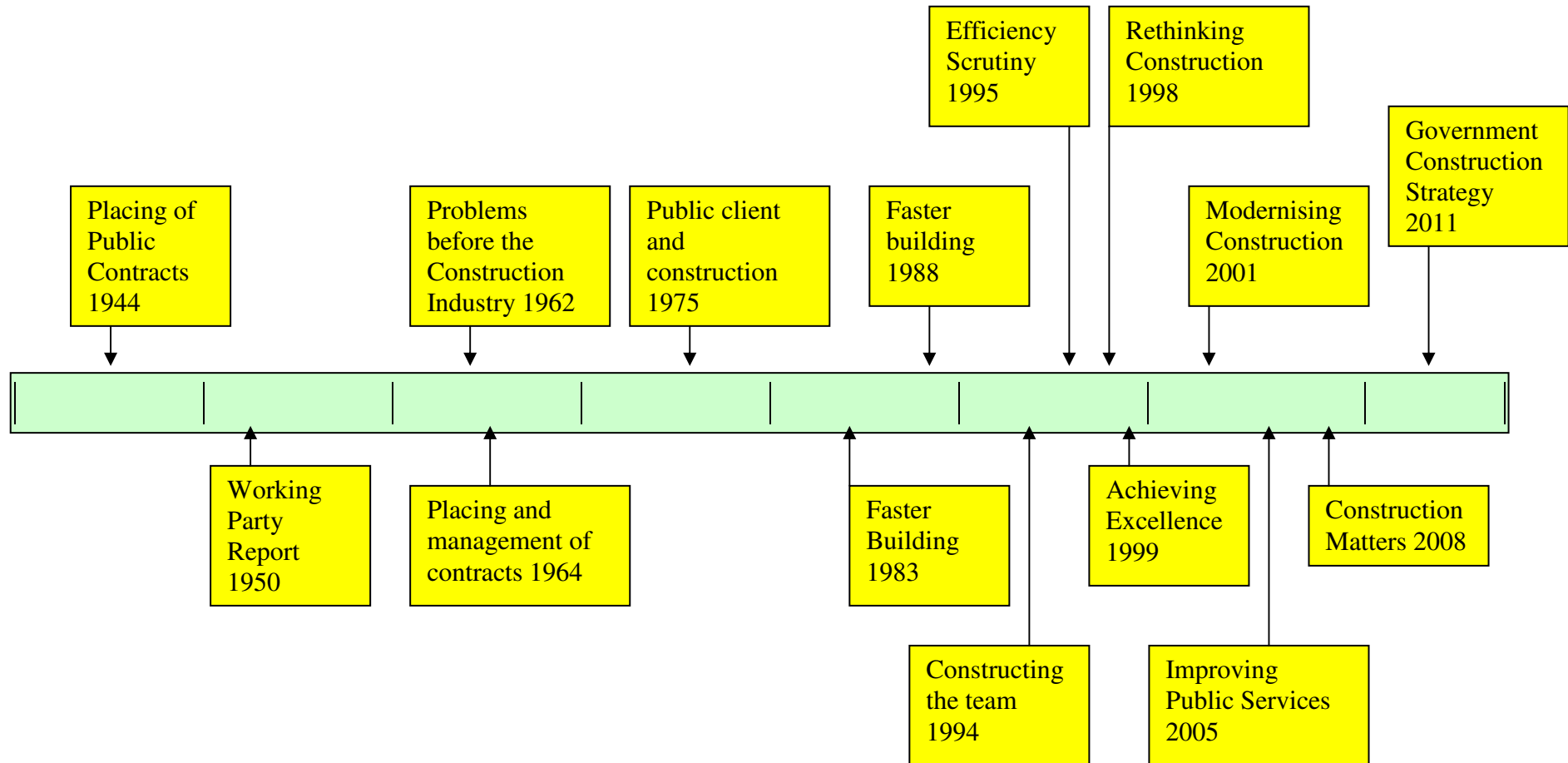


Figure 1.1: Timeline of significant public sector construction reports

1.7 Context and perspective of the reports

The fifteen construction industry reports examined by this research owe their origins to enquiries arising within a public sector background. Each report was either directly commissioned by a government of the time, or by a publicly enabled body representing government views. Therefore a natural bias exists which focuses upon achieving efficiencies on behalf of the government as a client based upon outcomes related to publicly funded projects, but the reports also balance difficulties from suppliers in achieving these objectives. Contextually, the reports are written from two polarised perspectives. Reports published between 1944 and 1980 are placed within a position of dominance by central and local government organisations as clients (Murray & Langford 2003). This is a realistic reflection of the time as significant sums of public money were invested into rebuilding infrastructure, housing and corporate buildings following the devastation of depressive years in the 1930's and residue damage from the Second World War. Therefore observations and conclusions from the reports assume government clients are powerful, with a dictatorial approach being applied. Solutions provided in response to the low performance standards suggested efficiencies through standardisation, appropriate contractor selection and continuity of work for the industry by management of client's budgets.

Post 1980 reports are written with a differing emphasis. Rather than applying a mandatory set of detailed instructions applicable to all projects, the reports reflect a governmental role as facilitator for best practice. This change compliments a significant reduction in post war spending on construction due to completion of large infrastructure projects such as the motorway network, power generation and supply systems, development of new town conurbations and the like. This 'post expansion' period, with commensurate reduction in public spending, reflected the balance with the private sector. Government organisations accounted for less than 40% of total UK construction workload and private sector clients became the predominant source for expenditure. Contextual positioning of government reports after 1980 became advisory, where additional factors brought through the success and experiences of large UK based contractors within the international market was a position worth exploring for potential gains for the UK economy. These reports sought to make the UK construction industry 'world class' and in so doing proposed adoption of a team

approach towards this achievement. Within this catalyst for change, the role of a client was identified as crucial, with partnership and team relationships recognised as leading towards an overall improvement in performance. In *Rethinking Construction* (Egan 1998), five drivers were specifically identified as motivators for change:

- Committed leadership
- A focus on the customer
- Integrated processes and teams
- A quality driven agenda
- Commitment to people

Relationship drivers included in Egan's Report were emphasised again and expanded further in *Modernising Construction* (National Audit Office 2001) through specific mention of investment in training and the better (thoughtful) use of innovation in projects. *Modernising Construction* also incorporated results from research undertaken concerning performance outcomes with public sector projects at that time. Although limited by the amount and depth of information available, results collated by Graves and Rowe (1999) were obtained through the Agile Construction Initiative programme supervised by the University of Bath. 'Headline' results from this research are given in Table 1.2.

Table 1.2: Project outcomes by Graves and Rowe (1999, p 11)

Costs:	Time:
13% of projects delivered under tendered price	10% of projects delivered early
14% of projects delivered on tender price	20% of projects delivered on
73% of projects delivered over tender price	time
	70% of projects delivered late

Although most post 1980 reports are forward looking, progress made by government departments as clients since 2001 is traced through a reverse facing report *Improving Public Services through Better Construction* (National Audit Office, 2005). In *Construction Matters*, (Business and Enterprise Committee, 2008) a challenge is thrown to the construction industry to demonstrate its strengths but also highlights

areas of weakness and once again explains the role a government can undertake. *Construction Matters* outlines a need for strategic leadership by the government, because even though expenditure is reduced, the government represents a major client that can exert a significant influence through legislative regulation. The final report examined by this research, *Government Construction Strategy* (Cabinet Office, 2011) takes an appreciably different approach to *Construction Matters*. This report maintains pressure upon the industry to perform as a whole by stating on page 3 that '*the UK does not get full value from public sector construction*'. However, rather than placing blame upon a single group to the construction process, *Construction Matters* provides a balanced view by recognising that the Government itself '*had failed to exploit the potential for public procurement of construction and infrastructure projects to drive growth.*'

Although performance is still a prime objective, an importance upon cost efficiency is highlighted. This is in part reaction to a global recession which started in the financial sector and gathered pace during autumn 2008 and a political change with UK Government (from the Labour Party to a Conservative/Liberal Democrat alliance) in May 2010. Scrutiny and accountability of public finances together with pressure upon government borrowing would be placed at the forefront of fiscal policy. These pressures are reflected by the report – where efficiency, value for money and cost benchmarking are prime objectives. Economic performance of construction assets and financial performance of projects forms the predominant emphasis of the 2011 Cabinet Office publication.

1.8 Integration with international public sector construction

Interest into performance and the contribution made by the construction sector toward economic growth as also recognised during the 1990's by many overseas countries. Whilst the UK government applied a critical analysis to the construction industry through a regular series of reports, other countries began to examine their needs in parallel with the Egan and Latham Reports. A common theme throughout the reports focussed upon strategic efficiencies – enacted through engagement with information technology and standardisation. Secondary themes relate to the growth prospects offered by the construction sector in order to energise a national economy. Suggestions on how to achieve such objectives vary between the reports, but reliable

spending profiles from clients and longer term relationships between parties through team working methods are regularly stated. The significant reports discovered from other counties are listed in Table 1.3.

Table 1.3: Significant overseas construction reports 1994-2000

Country	Report	Date
Australia	Building for Growth, Building and Construction Industries action agenda	1999
Finland	Re-engineering the construction process using Information Technology	1997
Ireland	Building our future together: strategic review of the construction industry	1997
Japan	Future directions of the construction industry coping with structural changes of the market	1998
Singapore	Construction 21: Re-inventing construction	1999
South Africa	Creating an enabling environment for reconstruction, growth and development in the construction industry	1997
United States of America	National Construction Goals	1994

1.9 Expectations and influences from outside the construction industry

Expectations of performance at a cursory level are a subjective view contained within an immersed environment. This environment is created from past experience and related to expectations with goods and services elsewhere. Whilst being dissatisfied with historical and current performance levels, clients also expect increasingly higher standards and levels of service from suppliers. Performance is not a static measure where satisfaction is achieved once a plateau has been attained, but a progressive demand requiring a model of continuing improvement. Meeting ever rising customer expectations was recognised by Mohamed (1996) as the way to satisfy consumer demands. Within manufacturing industries, attempts have been

made to incorporate progressive quality management systems such as those developed by ISO 14001 (International Organization for Standardization) and the Japanese approach called Kaizen (Imai, 1986). The expectation of reliability and guarantee standards provided by manufacturing and electronic goods has created a culture where consumers demand similar levels of performance from other products. Clients' expect accurate timescales, price certainty and lower defects for construction projects to match those attained with other consumable commodities (Hill, 1991).

1.10 The introduction of benchmarking

Whilst government reports recognised a number of problems with construction industry performance, the reports suggested strategic remedies of team working and long term relationships rather than operational methods. In order to provide a reliable system of comparison, introduction of measurement standards would be needed so that objective levels of performance could be calculated. The use of standards allowing comparison between projects is known as benchmarking where measurements can be taken for comparative purposes. But as Brown and Laverick (1994) commented '*measuring things did not guarantee quality*'. In order to be meaningful, systematic use of performance indicators with defined measurement rules would be necessary to enable consistent comparison of the industry at regional, national or international level. Statistical information is available through government agencies such as the Office for National Statistics but does not include the measurement of performance *per se*, instead giving a broad perspective of statistical trends in the construction industry in Great Britain through the last decade together with some international comparisons (ONS, 2011). Variances between output data at national and international levels are produced for comparative purposes, but this is not transferable to clients at a local level, nor are detailed enough to allow measures of performance to be determined.

An attempt to address the lack of measurable performance data was by publication of a report on UK Construction Key Performance Indicators (DETR, 2000) investigating use of key performance indicators (KPI) for the construction industry by suggesting industry wide standards for adoption. Eight years later, a review of recommendations made by the DETR report was undertaken within *Review of Construction Key Performance Indicators, Final Report* (Manchester Business

School, 2008) to determine effectiveness of monitoring overall performance of the construction sector and to gauge progress towards *Rethinking Construction* targets. In this review data was collected from a range of sources, including national statistics, but added by voluntary views collated from commissioned surveys. Although results from relative distributions of surveys to suppliers and clients were small, an attempt was made to reflect industry culture. Key findings from the review were:

- Total cost of preparation, management of data collection and publication was around £1m per annum funded between participants to the KPI process and central government by equal contributions. As the data results only represented around 400 projects, the cost of setting up and managing KPI data was significant.
- An overall view from responders' to the benchmarking process was positive, but participants to the study had modified standard KPI's to suit their particular circumstances.
- Overwhelming strong support was received for a formal measurement system for performance improvement, irrespective of the actual KPI's used.
- Doubts over the comparability of data inhibited a significant proportion of participants from using results taken from the national distributions to benchmark themselves against other organisations.
- Organisations had used favourable data from KPI's in marketing responses to tender invitations.
- KPI use was only effective in demonstrating performance to public sector bodies and social housing organisations. Benchmarking parameters such as cost per square metre for residential housing was useful but wider project characteristics for civil engineering schemes and the like made comparison difficult and unreliable.
- Respondents could not put any monetary value on benefits of using KPI's.

In addition, the review authors felt that bias could exist towards presenting an optimistic view of industry performance, particularly for indicators that depended upon individuals' perceptions. Reservations about reliability with comparison of the year-to-year trends were also a concern as data parameters tended to wander from the

original measurement points. Nonetheless, use of key performance indicators were recognised as relevant objectives and stated in *Rethinking Construction* as necessary for construction benchmarking. Such measurement techniques were seen as essential towards:

- Stimulating and informing improvement actions
- Informing markets for construction services
- Monitoring aspects of performance of the construction industry

Despite a number of concerns, the *Review of Construction Key Performance Indicators, Final Report* attempted to assess impact on the industry of these objectives, but an absence of reliable data prevented a calculation of the level of benefits to be provided. It recognised that membership of participants to the Constructing Excellence programme for collection of KPI's represents only a small proportion of the industry as a whole and perhaps was not representative of the structure of the industry. The report authors ultimately concluded that '*We are unable to arrive at a meaningful figure for the value of benefits derived from the KPI's but it is reasonable to conclude that these exceed the costs by a considerable margin*'.

Despite such concerns and limitations with KPI's, central UK government advisors continue to support usage of the headline performance results through the *2011 UK Industry Performance Report* (Constructing Excellence, 2011). Indicators are an aggregation from participants and therefore include an element of subjective information, but provided marking and assessment is consistent, it does allow comparative judgements to be made. These judgements are however global – because the structure of the construction industry relies upon a large number of small organisations to deliver services. Capture of data from the vast majority of companies is unrealistic and expensive. So a significant disconnect remains between individual suppliers, individual projects and overall industry standards. This is due the limitation of precise measurement of key indicators and the difficulty in matching very diverse groups of suppliers against an industry norm. Furthermore, although most participants perceive value with the benefits of benchmarking, quantitative calculation of those values are proving difficult to establish.

1.11 From benchmarking to frameworks used by the public sector

Within the private sector, agreements between suppliers and clients are a matter of commercial privacy and not subject to external scrutiny. Terms and conditions, selection of suppliers and operation of financial mechanisms are negotiated between the parties and provided these agreements are not illegal, the parties are free to engage in business using whichever methods they so wish. Private sector organisations owe responsibility to their shareholders and matters of commercial agreement are strictly confidential. Informal and private agreements between suppliers have been used ever since the earliest days of commerce and the structure and content of each agreement will vary considerably according to the objectives of each party.

Public bodies however have a duty of care when dealing with public finances and must comply with European procurement directives and the Public Contracts Regulations 2006. Central and local government organisations can only operate under additional constitutional rules, such as Standing Orders, and these govern financial operations and management procedures. If a government organisation exceeds authority given by a constitution, it is considered to be *ultra vires*, and any decisions made in breach can be challenged at law. This rule of control has created very prescriptive and detailed regulation with selection of suppliers and operation of construction contracts. In order to engage recommendations offered by Latham (1994) and Egan (1998), public bodies have had to make changes to their supplier selection methods so that legislative requirements are met. This required the ability to exclusively select multiple numbers of suppliers within a scope of service over a given period. The theoretical basis upon this method of engagement is the creation of longer term relationships between parties in excess of those offered by a single project. In return for this special relationship, suppliers are expected to perform to higher standards, rather than the 'cut and run' scenario afforded by discrete procurement. Thus, 'frameworks' were developed under an EU Directive 2004/18/EC of the European Parliament and of the Council of 31 March 2004 for the coordination of procedures for the award of public works contracts, public supply contracts and public service contracts. Within this legislation frameworks were defined as '*an agreement with suppliers, the purpose of which is to establish the*

terms governing contracts to be awarded during a given period, particularly in respect of price and quantity'. Two distinct forms of framework have developed within the European legislation:

- European Union (EU) compliant 'approved lists' with a large number of suppliers (often over 20) where there was no guarantee of any work and the use of a further competition process is needed to determine supplier selection
- Strategic frameworks with a small number of suppliers (often not more than 6) where the bidding process includes recognition of measured performance. Strategic frameworks cannot exceed four years duration unless specific approval is sought and there is a financial or operational justification for awarding a longer time period. Strategic frameworks may also use a further competition process to determine selection of a supplier but there must be a financial connection between the framework bid and any 'call off' works package. This can consist of fee percentages, measured rates or other financial mechanisms at the first stage of the bidding process. Financial and selection transparency has become a topic for professional practice within English law following a challenge from a supplier in *Henry Brothers (Magherafelt) Limited verses Department of Education for Northern Ireland (2008)*.

EU approved lists are a tried and tested procurement engagement method – and are in essence similar to existing 'selected lists' used by local authorities to maintain a database of suitably experienced suppliers. Approved lists allow suppliers to be offered an opportunity to price for a project but the selection process is often on a rotational basis or decided by suitability. The work packages are tendered discretely and there are no linkages between packages. As the number of suppliers to an approved list framework is extensive, an opportunity to win a project is diminished and a close relationship between parties is doubtful.

Strategic frameworks for public sector contracts are however a new development of the procurement process. The objective of a strategic framework is to create a long term relationship by engaging with fewer suppliers when compared with traditional

select lists. Initiatives suggested by government reports, particularly those of Latham (1994) and Egan (1998), follow the examples explored by manufacturing industries. The proposition theorises that if numbers of suppliers are restricted, then closer relationships may be forged between parties and resultant increases in performance outcomes may be achieved. There is not however universal acceptance of these principles. Some practitioners argue that reduced numbers of suppliers can create complacency with economic tendering and may stifle innovation. Morgan (2009) warns of a restriction on competition, inability to engage with new entrants and the doubtful improvements in performance of projects under a framework procurement method. Financial competition will be examined as part of performance outcomes with this research project.

1.12 Value from this research

This research will investigate drivers of performance within projects using data collected from a specific area of the construction industry – namely, civil engineering infrastructure projects. Focus upon a narrow range of project characteristics will enable detailed analysis to be undertaken for specific areas of performance such as project timescales, health and safety and quality of final product. In addition, the effectiveness of tender prices will be examined to determine if concerns from practitioners are realised. The examination will be made upon a case study where variables are reduced through controlled design parameters, design teams and construction management techniques. This opportunity is available because all projects included within the case study (pre and post framework) are to the same design standards, procured through the same design and supervision teams where management controls are applied consistently throughout one large organisation. The organisation is of sufficient size and has existed for a considerable duration to enable comparable data sets to follow a ‘compare and contrast’ process. Projects procured over a two year period using traditional local authority select list method (2006 – 2008) will be compared with those undertaken within a framework (2008 – 2010). In contrast to key performance indicators prepared by *Constructing Excellence* the value of this research is achieved through defined performance outcomes applied to detailed project outcomes of financial and contractual data collection for quantitative analysis. All key project data outcomes are supported by operation of the conditions

of contract applicable to that project. For example, project time scales will be those determined by letters of appointment and completion. Variations to programme will be referenced to agreed contractual variations and the like. Reliance upon contractual data will remove subjectivity, as far as possible, from outcome results.

1.13 Summary

The construction industry has been criticised for a lack of performance in the execution and management of projects together with dissatisfaction from performance of completed assets. Although isolated instances of complaint have arisen from the private sector, the predominant dissenting voice comes from public sector organisations – particularly through central national governments. Criticism is not a recent phenomenon. An examination of UK government reports in Table 1.1 spanning more than six decades correlates similar themes – low productivity, less emphasis lowest price, even and regular supply of workload, better cost prediction, less defects and completion to time and budget. Some reports offer possible solutions for improvement whilst others suggest the industry itself finds performance gains through collaboration and smarter working methods. These views are paralleled internationally, through overseas government reports as recognised in Table 1.2.

One reaction to this continual and considerable criticism of both industry and government organisations alike is the formation of frameworks – where longer term relationships can be established with the intention of performance improvement to projects. Public sector frameworks have only been in existence for a relatively short period of time with the first tranché specifically for construction coming into existence around 2005. As frameworks use a separate contractual engagement process, development of standard documentation has only been available since 2006 and therefore very little research has been undertaken to analyse performance outcomes and cost implications afforded by this method. This research seeks in part, to address a current gap in this area of knowledge by examination of this topic. Furthermore, the research seeks to recognise drivers of performance by constructing a performance management model from within the case study environment in order to provide a holistic view of framework operation.

The framework agreement under examination has been in operation for more than two years and is contained by a stable and reliable organisation. As the contextual

positioning is from a perspective of public sector engagement, the chosen organisation is a significant local authority with a recognised standard for designing and managing construction projects. Furthermore, the same organisation has substantial out turn data for projects undertaken prior to introduction of frameworks in order to provide a comparison of results.

A global assessment of the areas of published literature applicable to this research has been undertaken in order to provide boundaries and focus for this thesis. Not all areas require equal representation because predominance is placed upon quantitative data and interface with associated research will form the substantive part of the study. An awareness of other areas is however needed to fulfil the whole case study story. Graphical representation of this global assessment is shown in Figure 1.2.

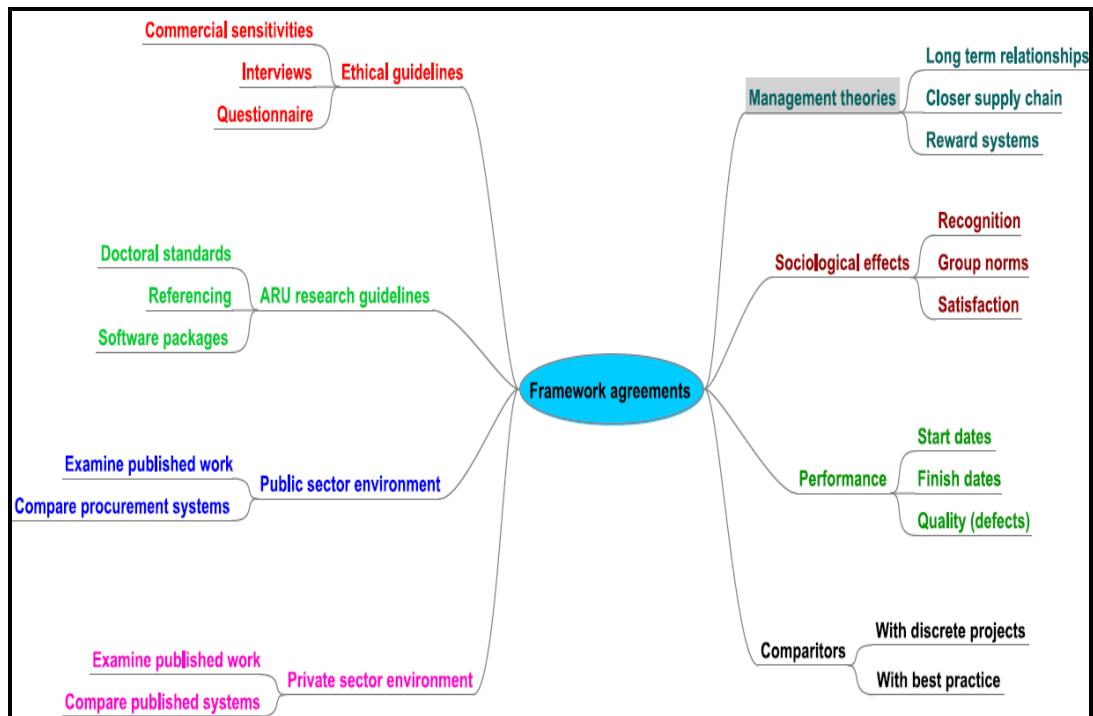


Figure 1.2: Graphical global assessment of topics associated with this research

An initial investigation into published research undertaken into framework agreements has uncovered anecdotal claims of increases in performance where suppliers are engaged through arrangements which embody principles of long term and closer working relationships. Conversely, some practitioners feel that such closed arrangements stifle competition and innovation. Central government reports, particularly *Government Construction Strategy*, recognise the improvement made through frameworks but it cautious with results.

Investigation and analysis of a framework agreement set within a significant public sector organisation together with a suggested model for performance management will contribute towards knowledge of the topic and lead to development of professional practice for the subject matter.

CHAPTER 2: IMPACT OF FRAMEWORK AGREEMENT APPROACH

2.1 Historical reference of framework arrangements and development of framework agreements

Private sector arrangements between suppliers and those of a supply chain are a matter of commercial privilege and therefore not subject to regulation or publication. Provided arrangements are not anti-competitive and comply with other legal requirements, they make take whatever form the parties decide. Earliest forms of private sector framework *arrangements* are detected within manufacturing industries, where chains of component suppliers are engaged over long time scales. As part of this arrangement, suppliers commit to continuous improvement of their products in order to remain with the manufacturer. Examples of such arrangements are available with the automotive sector and these have been analysed in detail (Porter, 1980).

In 1994, British Airports Authority (BAA) plc embarked on a significant programme of expansion of its major airports, and conscious of the reputation of the construction industry together with previous poor project outcomes, decided to embark upon a new strategy of supplier engagement. Instead of separating projects into elements which were tendered discretely using a large number of suppliers, BAA took the decision to work with a small number of contractors engaged for specific time periods (usually five years terms) with payment on a 'cost plus' basis (Davies *et al*, 2009). In return for commitment from the client, suppliers were guaranteed a level of return on net costs, with the client retaining most risks associated with the construction process (Potts, 2007).

In the same year (1994), publication of *Constructing the Team* by the UK government reviewed procurement and contractual relationships within the industry. Recommendations made by Latham (1994) focussed upon use of collaborative methods rather than adversarial contracts. Earliest forms of collaboration were structured through partnering arrangements between parties in addition to contractual considerations. Partnering arrangements evolved into framework *arrangements* where memorandums of understanding between a client and a number of suppliers defined objectives of the parties in addition to contractual requirements included by the specification and drawings. Another example of framework *arrangement* in the private sector is the programme of refurbishment executed by

Tesco plc in continually upgrading its grocery superstores. A strong chain of preselected suppliers are commissioned for various components involved in the refurbishment process. Long term programmes are issued to the suppliers but individual projects are called off at short notice. Placing the suppliers on a 'stand by' basis has reduced delivery times for projects from 40 to 18 weeks (Select Committee, 2008, question 445). The client receives priority in delivery in return for commitment to workload.

A transition from framework *arrangements* into framework *agreements* followed development of industry standard legal documentation to encourage wider usage, cumulating in publication of standard contract forms such as the Framework Agreement version of the New Engineering Contract 3rd Edition (NEC, 2005). The significant legal distinction between *arrangements* and *agreements* is that the former supplements other dominant contractual arrangements whereas the latter acts as an umbrella contract with terms outlining engagement and selection methods for calling off future work packages (OGC, 2008). Maturity of available legal documentation together with development of EU Directive 2004/18/EC of the European Parliament allowed public sector organisations to form framework agreements under strictly regulated procurement regulations.

2.2 Characteristics of framework agreements

Framework agreements are arranged between parties with the intention of establishing long term collaborative working arrangements. A client may enter into a framework agreement with a single operator or with several operators. The framework agreement provides an 'umbrella' contract with projects separated into individual 'work packages' which have discrete conditions of contract, specification and payment mechanisms.

Within the public sector, framework agreements are initiated through one of three distinct procedures. An open procedure allows all suppliers who can meet minimum standards to be included within the framework with no restriction upon participant numbers. A restricted procedure requires suppliers to qualify for a place on a tender list by successful completion of a pre-qualification questionnaire. Restricted procedures cap the maximum numbers of participants and a tendering process reduces the number of successful suppliers further. An element of financial

competition is introduced at tender stage. A negotiated procedure applies where participants are invited to submit considerations in line with advertised criteria. The client enters into a series of competitive dialogues with suppliers and these discussions refine detailed specifications, objectives and costs. Suppliers not meeting criteria are discarded until the required number of suppliers for the framework are identified. An overview of the process is shown at Figure 2.1.

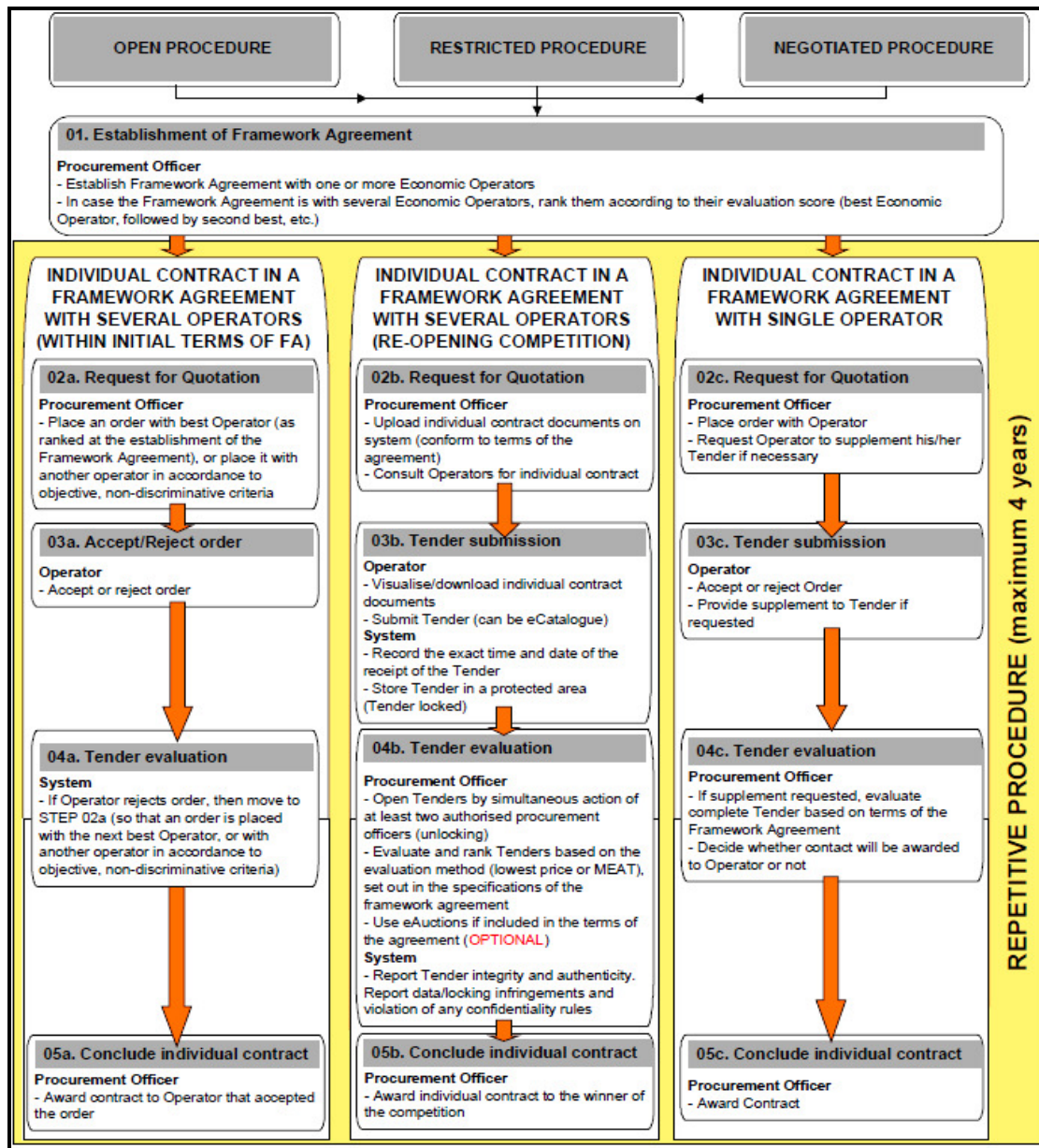


Figure 2.1: Framework agreement procedures and themes modified from p41 of Functional Requirements (European Communities, 2005)

Following an initial participant selection procedure, the framework agreement itself is prepared. Framework agreements follow contractual themes and these can be varied according to objectives of the framework. The themes are:

- A framework agreement which includes a significant number of terms, conditions and prices. Individual contracts for work packages are chosen from a list of suppliers in accordance with the selection procedure contained in the framework agreement.
- A framework agreement which has few terms, conditions or prices. Suppliers are chosen for individual contracts for work packages by a second stage (mini-competition) procedure.
- A framework agreement with a single supplier. Work packages are all offered to the single supplier on the basis of acceptability.

The boundaries at which the framework agreement operates and those of individual contracts may vary, but actual terms and conditions for a work package are included within that work package and will operate as a standard construction contract. Legal convention determines that terms in work package will take precedent over framework conditions – although remedies for both contracts are available.

2.3 Characteristics of the framework agreement approach

An assumption made by early central government reports is that public sector procurement cannot manage large scale projects as effectively as the private sector due to reduced market pressures (Construction Excellence, 2009). Evidence placed before the House of Commons (Business and Enterprise Committee, 2008, p20) suggests that *‘it is false dichotomy to differentiate between the public and private sectors on their performance as construction clients’*. The committee concluded that a significant influence upon project success is the frequency of use of construction services rather than the sector within which the project is set. Experienced clients, either public or private sector based, are more likely to understand how the construction process operates and realise the critical nature of key decisions at appropriate stages than those clients who use construction services infrequently. Clients that align critical phases of a construction process with their own control

systems (for example, internal budgetary approval aligns with tender receipt) will outperform those who do not.

A prime characteristic of a framework agreement is the term – the pre-determined timescale for operation of the agreement. With public sector agreements, Public Contracts Regulations 2006, and EU Directive 2004/18/EC of the European Parliament of the Council of 31 March 2004 dictate that the maximum term of a framework agreement shall be four years in duration, unless strong exceptions can be demonstrated. A secondary characteristic of frameworks is that a client may enter into a number of identical agreements with different suppliers effectively creating a selected community with which to deliver projects.

Framework agreements are therefore not intended for single user clients or an individual project. They are designed for use where similar sets of works or services are required of a selected number of suppliers over a period of time. A term of four years allow relationships and understanding to be nurtured where focus can be placed upon overall service rather than individual isolated performance of a project. Although framework arrangements are permitted between a single client and single supplier, a lack of incentive or competition may affect outcomes. Most framework arrangements are therefore between a client (or with conjoined clients) and multiple suppliers to allow competitive elements to be incorporated.

2.3.1 Perceived benefits of a framework agreement

A number of perceived benefits are stated to apply through the use of framework agreements (Construction Excellence, 2009). These can be summarised as follows:

- More effective and efficient tendering procedures for clients
- Continuous improvement from engagement of best practice
- A greater depth of understanding between all participants due to longer term relationships
- Ability for suppliers to gain a higher success rate with bidding for projects.
- A higher level of commitment for a client due to longer term relationships

Never Waste a Good Crisis – A Review of Progress since Rethinking Construction and Thoughts for Our Future (Construction Excellence, 2009) approached

frameworks from the contextual position of a central government organisation, but these attributes are also recognised by a number of local and regional authorities. Construction Framework South West (2009) is a regional body consisting of geographically adjacent local authorities formed to share resources for effective and efficient delivery of projects and their literature added further incentives for use of frameworks:

- Earlier involvement of suppliers
- Faster delivery of projects
- Collaborative working
- Elimination of contractual disputes

The Department for Communities and Local Government has instructed the National Improvement and Efficiency Partnership (NIEP) to provide expertise and advice regarding procurement, asset management and client leadership. The preferred vehicle of procurement for efficient and effective delivery of projects is the framework agreement where strategic decisions for long term programmes of work can be applied (NIEP, 2011). This endorsement is also considered by Construction Excellence (2009, p7) stating:

'better results could be achieved through long-term relationships based on clear performance measures and sustained improvements in quality and efficiency by continuing to learn and improve as a team, rather than competitively tendering and having to create a new team for every piece of work.' In recognition of successful teams that have integrated processes and achieved results through programmes allied to these recommendations, Construction Excellence (2009) named certain public sector organisations for the positive approach adopted in improving relationships between stakeholders:

- NHS Estates Procure 21
- Defence Estates Prime Contracting
- Birmingham City Council
- Manchester City Council
- Hampshire County Council

An explanation of economic benefits with frameworks cited by authorities' concerns transaction costs through aggregation of projects. Figure 2.2 states the value of works

and services that are required to be procured and advertised through the Official Journal of the European Union as required by the Public Contracts Act 2006. These statutory regulations require a separate advertisement for each project in excess of the values stated. Framework agreements allow projects to be aggregated together provided an accurate scope of works is provided, simplifying the procedure into a single tender exercise for all projects contained within the framework.

Summary of Threshold Levels from January 2012	
<u>The Public Contracts Regulations</u>	
<u>Supplies & Part A Services (except R & D, and certain telecom services)</u>	
Schedule 1 bodies	- £113, 057
Others	- £173, 934
<u>Part B Services & R & D, and certain telecom services and subsidised services (regulation 34)</u>	
All bodies	- £173, 934
<u>Works</u>	
All bodies	- £4, 348, 350
<u>Small Lots</u>	
Supplies & Services	- £69,574
Works	- £869,670

Figure 2.2: Excerpt from Procurement Policy Note regarding threshold levels of contracts subject to European procurement regulations (Cabinet Office 2011).

In addition to savings with transactions costs, there are benefits to be obtained due to adherence with European requirements for minimum tendering time periods. Such minimum periods are mandatory and vary according to the choice of procedure selected – an open procedure requires a minimum of 52 days between issue of invitation and completed tender response. Construction projects are often procured using the restricted procedure where suppliers are graded using a two stage process – stage one is prequalification and stage two is the tendering period. The latter procedure requires an overall minimum of 77 days. Examples of statutory minimum European Union time scales are shown in Figure 2.3.

An aggregation effect under a framework agreement also allows a reduction in tender periods for individual project work packages which, once the framework has been

advertised and suppliers selected, can be reduced significantly. There are no minimum statutory tender periods for project work packages within a framework agreement.

EUROPEAN UNION TENDERING TIMETABLE				
	<i>Restricted Procedure With PIN</i>	<i>Restricted Procedure Without PIN</i>	<i>Open Procedure With PIN</i>	<i>Open Procedure Without PIN</i>
Issue PIN	Minimum 52 days from issue of OJEU to Issue of OJEU advert.		Minimum 52 days from issue of OJEU to Issue of OJEU advert.	
Issue advert within the Official Journal of the European Union (OJEU) requesting expressions of interest from potential suppliers.				
Issue any other adverts to relevant publications as appropriate.				
Advert response, expressions of interest.	Minimum 37 days from issue of OJEU advert to receipt of responses from potential suppliers.	Minimum 37 days from issue of OJEU advert to receipt of responses from potential suppliers.		
Issue tender after evaluation of the expressions of interest.				
Scene setting if appropriate to the exercise.				
Tender response	Minimum 26 days from issue of invitation to tender, to receipt of tender response.	Minimum 40 days from issue of invitation to tender, to receipt of tender response.	Minimum 36 days from issue of invitation to tender, to receipt of tender response.	Minimum 52 days from issue of invitation to tender, to receipt of tender response.
Company presentations if appropriate.				
Award of contract				
Notification to OJEU of the award of contract	Minimum 48 days from award of contract.	Minimum 48 days from award of contract.	Minimum 48 days from award of contract.	Minimum 48 days from award of contract.

Figure 2.3: Minimum requirements for tender periods extracted from European Requirements (OGC, 2008).

2.3.2 Criticisms directed at framework agreements

Although framework agreements have received support from central government (Business and Enterprise Committee, (2008), p21) they do not have universal acceptance by all stakeholders of the construction process. Such criticisms arise through incorrect application of a framework by a public body or questions of economic effectiveness of frameworks. Within the private sector, clients are free to operate agreements as they wish without external scrutiny, whilst public sector clients are responsible to elected members and ultimately contributing tax payers. One of the concerns with use of frameworks is a possible restriction of competition due to reduced numbers of suppliers or the engagement of a single supplier. In

recognition of this Article 32.2, Directive 2004/18/EC of European Regulations states:

‘Contracting authorities may not use framework agreements improperly or in such a way as to prevent, restrict or distort competition.’

Furthermore, the European Courts require that competition is placed at the fore of public sector procurement through case law:

‘development of effective competition in the public procurement sector is one of the objectives of the Directives dealing with this area’ (Sintesi, 2004)

and confirmed through comment upon competition law:

‘public procurement directives do not operate in a legal vacuum – both Community and national competition rules apply to them’ (Commission European, 2005, p 5).

Application of statutory, advisory and case legislation places a significant burden upon contracting authorities to ensure that framework agreements comply with European Directives and also operate in a fair and transparent fashion.

Concerns with competition due to a smaller number of suppliers have also been expressed through the private sector. Although some private sector organisations pioneered use of framework agreements, pressure on capital budgets due to economic contraction over the last three years has caused re-evaluation of value for money to be undertaken. BAA plc were amongst the first to develop framework arrangements based upon a ‘cost plus’ model in order to secure commitment and resources for large capital projects. The economic down turn since the financial market collapse in 2008 has challenged strategic views of the effectiveness of this model. BAA’s framework arrangements expired during 2009/2010 and were replaced by elements of traditional tendering with a wider list of suppliers effectively mirroring a traditional procurement model (Morgan, 2009).

A substantial reduction in fiscal government spending for the year 2011/2012 has also questioned the value of framework agreements for public authorities, both in quantum of transaction and capital costs, with a number of clients reverting to ‘lowest bid wins’ models. This may be considered a retrograde step reflecting engagement methods used by public authorities prior to introduction of collaborative frameworks (Flanagan *et al*, 2005). Selection of lowest price bids by public clients is understandable due to the scrutiny upon which such decisions are made (Flanagan *et al*, 2007) and financial pressures upon construction budgets.

2.3.3 Impact of framework agreements upon client organisations

Economic and value considerations aside, there are a number of features specific to framework arrangements which impact upon resources or the managerial structure of a client organisation. For public sector organisations, departure from use of strict traditional procurement methods requires authority from elected members. An initial impact of a framework is the strategic shift within an organisation to move from discrete procurement to establishment of long term relationships. The strategic shift has an effect upon operational matters and managerial structures need to align with specific attributes of a framework. These are:

- Resources required for initiation of a framework together with an extensive selection procedure of suppliers together with rules for ‘call off’ projects within the framework.
- A structure for monitoring performance of suppliers and encouraging performance with suitable reward or selection mechanisms.
- A method of encouraging innovation.
- A substantial programme of work so that suppliers can employ continuity of resources.
- Encouragement and establishment of suitable channels for feedback between participants.

Whilst effective use of a framework requires a focus upon performance, one impact of introduction of a framework is the restrictive nature for new suppliers. Under current European legislation, additional suppliers cannot be added to an existing framework. Suppliers may be removed from a framework through non-performance or may wish to be removed through cessation of trading, but vacancies cannot be filled by introduction of new suppliers.

2.3.4 Impact of framework agreements upon supplier organisations

A supplier’s involvement within a framework provides a contextual position that differs from a traditional procurement model. Commercial interests for suppliers are heightened through an ability to gain a higher proportion of successful tenders due to the restrictive nature of a framework community. Although work packages for

individual projects are subject to competitive pressures, the certainty that one supplier within the closed community will be awarded each project provides an incentive for all too actively participate. The ability to gain a proportion of a regular and secure work stream provides levels of continuity that are not present with discrete tendering methods.

In return for a position within a framework, suppliers are often expected to participate with other activities and provide resources towards performance of a group that are not available for a single project. Suppliers to frameworks will look to improve performance as a group – for example as providers towards highways infrastructure – and seek to be aware of stakeholders and the effects of project to the wider community. This requires a managerial resource to attend meetings together with the authority to implement changes within the supplier organisation.

Operationally, inclusion within a framework involves additional demands due to the collection of performance data and monitoring of key indicators or critical factors. Although some data is applicable to all projects irrespective of procurement method, such as contractual dates, frameworks often include more metrics when compared with discrete projects.

2.4 Framework project development and performance impact

A review of the impact of framework agreements necessitates examination of the development of a construction project in order to identify the most appropriate period to apply performance evaluation methods. Performance evaluation can be measured at any stage of project delivery, but difficulties occur with methods of measurement and quantification of results until a project reaches sufficient maturity for tangible metrics to be applied. Research into construction project management has identified six phases, namely - conception, planning, design, tender, construction and operation (Lim and Mohamed, 1999). Each phase requires efficient execution in order to contribute toward successful delivery of the completed development, but the nature of the phases incorporates distinct dynamism. Resources used for elements of concept, design and planning may be recorded to provide comparative costs or timescales for a project, but the variances between projects render such outcomes inherently unreliable. A single external variable at the early stage of a project – for example, a planning delay, causes comparisons to be unrealistic. Controlled phases

of a project at later stages where levels of specification, time periods and constraints/extent are known allowing parameters to be measured and results quantified. For these reasons project management research concentrates upon the construction phase as a focal point for examination of performance outcomes (Ahadzie *et al*, 2006).

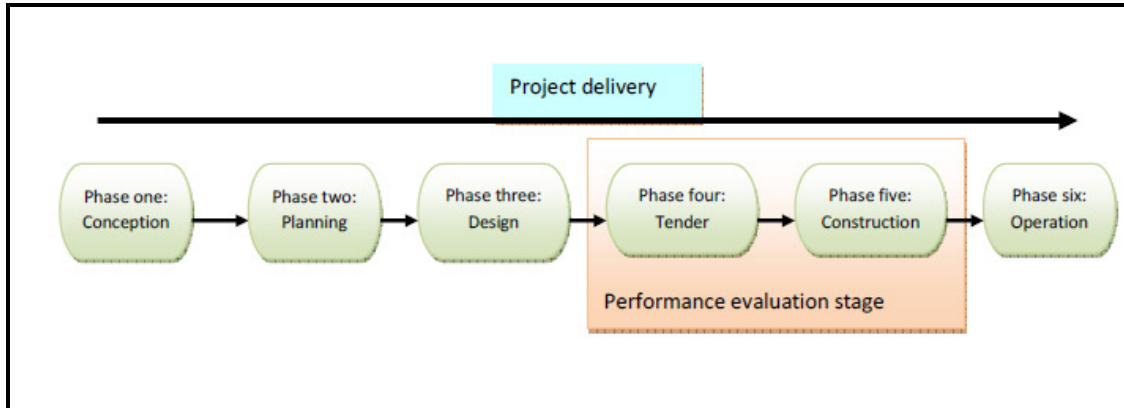


Figure 2.4: Six phases of project delivery showing performance evaluation stage

Six phases of project delivery suggested by Lim and Mohamed (1999) are shown graphically in Figure 2.4 and provides a basis under which to understand impact of framework agreements through performance outcomes examined at tender and construction phases. It also provides a comparative to results from discrete projects because the performance evaluation stage equally applies with those contained in the case study under consideration by this research.

2.5 Alignment of performance improvement objectives within the public sector

A generic view of the project delivery process illustrated by Figure 2.4 suggests the optimised period with which to undertake performance evaluation. At a strategic level, thought is required for the objectives of performance outcomes. Within public sector infrastructure projects, guidance to outcome measurement has been provided through publication of the *Infrastructure Cost Review: Main Report* (HM Treasury, 2010) where improvement objectives have been identified for operational application. These objectives are aimed at both central and local government organisations for use with infrastructure development and improvement. Figure 2.5 shows the five key objectives of the report providing guidance for performance outcomes. The implication for performance outcomes are a strong relevance to

continuity of workload and long term relationship that can be delivered through framework agreements. Figure 2.5 places project improvement objectives at the centre of delivery, whilst strategic objectives are peripherals allied to the central function. The framework agreements examined in this research precede this model but reflect objectives closely – albeit at a regional rather than national level.

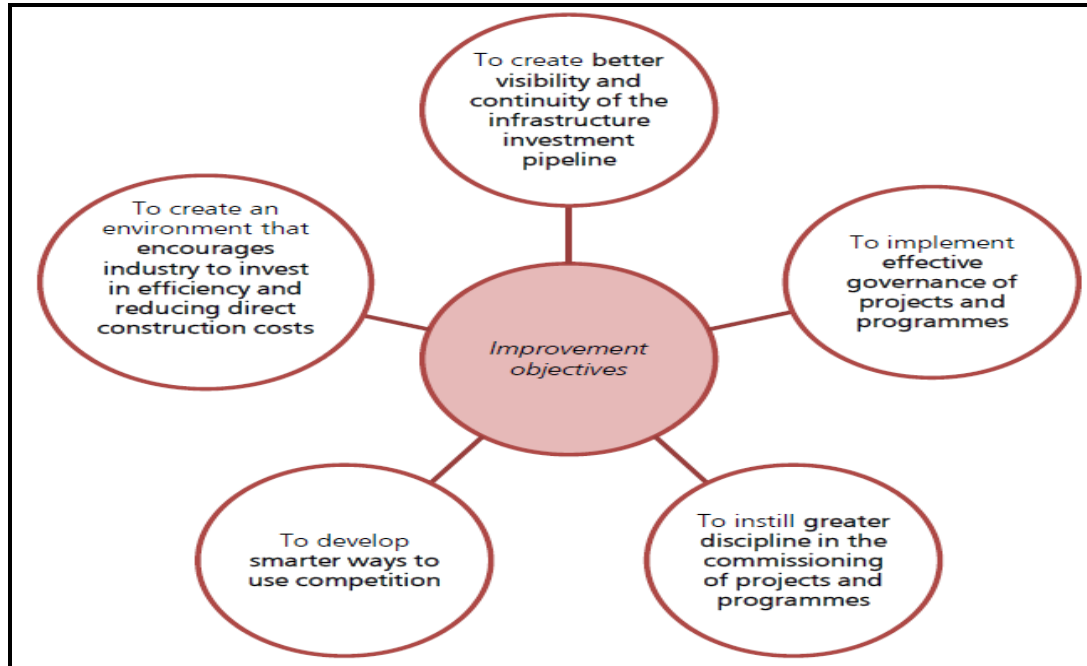


Figure 2.5: Improvement objectives for highways projects as determined by *Infrastructure Cost Review: Main Report* (HM Treasury, 2010)

2.6 Performance outcomes and phases of framework project delivery

As identified by Figure 2.4, the most suitable phase of framework project delivery to undertake performance evaluation is from a tender period through to completion of construction. Figure 2.5 identifies strategic improvement objectives for infrastructure projects following consultation between central and local authority organisations (HM Treasury, 2010) to satisfy performance requirements. Correlation between the six phases of project delivery and tasks together with identification of improvement objectives allow examination to be undertaken with operational development of projects where resources and measurement of performance can be identified. Table 2.1 cumulates project delivery phases with tasks and resources for infrastructure projects. Contents of Table 2.1 aggregate operational tasks and resources to identify suitable metrics for comparison at each stage of a standard project. Phases one to

three (conception to design) are controlled by detailed procedures to ensure legal and design obligations are met irrespective of costs or times taken to ensure compliance. As development of infrastructure projects involve a large number of stakeholders, early stages of a project are difficult to estimate in terms of timescale and cost. Metrics used to calculate benchmarks for these early phases (e.g. the cost of planning compared with capital value) indicate a wide range of results (Flyvbjerg *et al*, 2003).

Table 2.1: Alignment of six phases of project delivery with resources and performance metrics of the projects contained within this research

Project phase	Tasks	Resource Allocation	Metric
Conception	Initial objective Feasibility Budget estimate Affect stakeholders	Need identified by internal officers Initial design by internal designers Budget calculated by internal officers Organisation contacts other parties	No available base line for comparison of projects
Planning	Engagement with land owners, statutory authorities and agreement with Elected Members for approvals	Organisations' technical and managerial officers	No available base line for comparison of projects
Design	Production of specification, drawings and tender documents	Designers and cost advisors	Comparison of costs and timescales available but no reliable yardsticks
Tender	Tendering process, selection of supplier, comparison of budget against accepted tender	Cost advisors, suppliers	Comparison of elements of cost available per project
Construction	Mobilisation, temporary works, permanent works, demobilisation	Supervisors, cost advisors, suppliers, construction managers	Metrics available to include costs, timescales, defects and safety standards
Operation	Accepted project taken into portfolio of highways authority assets	Organisations' asset managers	No available base line for comparison of projects

Phases four and five of the project delivery do provide an opportunity to collect comparative data for analysis of performance provided all projects follow national standards and specifications. Incorporation of a project into an asset base will vary

according to the location, nature and extent of the project. This therefore identifies phases four and five of this research as the most appropriate periods for consideration of performance evaluation.

2.7 Contextual perspective of frameworks performance

A single definition of project success will vary according to those asked, the contextual positioning of the individual or organisation and the specific objective being considered (Ankrah and Proverbs, 2005). Performance criteria, which uses commonly shared mechanisms such as detailed metrics to measure elements, can be employed to align results from different projects (Krima *et al*, 2007) provided that a unified measurement process is used. Measurement is helpful for alignment of complementary metrics between projects but such metrics do not in themselves demonstrate project success. Although the range of measurement parameters has expanded with construction research, Atkinson (1999) reaffirmed the traditional view of project performance success by focussing upon the 'iron triangle' of delivery to anticipated cost time and quality.

Mullins (2005) widened this view by including factors such as profitability of the supplier, satisfying shareholders and the effects upon society as a whole. Loosemore *et al*, (2003) included job satisfaction of project participants as additional criteria for success, whilst Fenn (2006) focussed upon commercial considerations such as delays, claims for additional funds, project monitoring and control. Each additional criterion engages with a wider audience which produces a holistic view, but collection of relevant and comparable data poses problems. In order to regulate such extraneous results Soetando *et al*, (2002) suggests that marking of performance metrics should be restricted to views of participants involved with the project – namely client, supervisor (engineer) or contractor (supplier).

Nonetheless, predominant focus of construction management research concentrates with contextual performance of the supplier (Proverbs and Faniran, 2001), (Costa and Formoso, 2004). This recognises the significant resources and impact a supplier has with the construction process and effect upon outcomes (Xiao and Proverbs, 2003).

2.8 Summary

At the start of this chapter, historical development of framework arrangements and progression into framework agreements was examined in the context of private and public sector procurement. A detailed examination of components to a framework agreement is followed by recognising critical considerations, with conditions under an umbrella agreement and call off projects as operational elements.

Reference to government reports identifies that regular clients of the construction industry are more likely to be successful in managing projects than those who do not often engage with the industry – and that there are no significant differences in performance between public and private sector clients with this respect.

Perceived benefits and criticisms of framework agreements are identified using areas of commonality – that is, changes with performance of price, time and quality. Exponents of framework agreements refer to improvements in all three areas of performance whilst detractors question the effectiveness of this method of procurement. Irrespective of outcomes, an investigation of the impact framework agreements demand of clients and suppliers highlight additional resources with management of the method.

This research seeks to investigate the framework effect with performance outcomes between discrete and framework projects and in addition compares production and transaction costs for comparison to be analysed later. The results will be used for publication of professional practice to assist with evaluation of claims of performance in light of contra views.

With a focus upon ‘what performance means to the public sector’, improvement objectives are collected through a central government infrastructure report. These will be expanded further in this research for use within a local authority situation. An appropriate period within which to measure performance specifically for framework projects reaffirms the tender engagement and construction phase of a project as the most suitable period to gather metric data, and this will align with traditionally procured discrete projects. The latter discovery is significant as it allows comparison between framework and non-framework projects to be undertaken using the same basis and rules of measurement. An alignment of rules allows contextual positioning to be established with reference to published studies that reaffirm the ‘iron triangle’ of price, quality and time. These are added by other measures to represent client’s

specific wishes – known as ‘critical success factors’ of a project – which enable indicators to be established. The contextual position also identifies who should be marked – namely the supplier – and who should decide and mark outcomes – namely the client, supervisor and supplier. This reflection represents control of outcomes by each party during engagement and construction phases of a project.

CHAPTER 3: LITERATURE REVIEW OF FRAMEWORK AGREEMENTS AND APPLICABLE THEORIES TOWARDS A PERFORMANCE MODEL FOR RESEARCH

3.1 Introduction

Concerns with performance in terms of time, quality and cost were explored earlier in this thesis, through reference from published reports (Latham, 1994, Egan, 1998) suggesting that causation arose due to a fragmented engagement process leading to poor design solutions, defects and encouragement with innovation.

Introduction of collaborative arrangements proposes use of integrated teams by transforming relationships from a client through the supply chain. The effect of a suitable engagement process upon relationships may be significant (Forgues and Koskela, 2008) because the nature of roles and responsibilities of parties to a project is often determined at this stage. Such artefacts are also influenced by boundaries set through operation of conditions of contract and control mechanisms (Koskinen, 2009).

Critical discussion of the engagement process between clients and suppliers provides an opportunity in this chapter to encompass professional practice and published literature to allow development of a model for performance. During this critique, an attempt to uncover pre and post contract factors that affect performance outcomes of a project is made. The periods examined correlate to the optimum period of analysis for metric observation discovered in chapter two. The tendering period and post contract construction phases generate the most activity for participants to a construction project and it is also during these phases that interaction is made between groups and during which economic activity is at its maximum extent.

In constructing such a model, a positivistic approach is applied which reflects technical rationality of the industry (Schon, 1995) and engages with operational boundaries set by contractual conditions. This is supplemented by recognition of team working and complex sociological interaction used by participants to the construction process (Patton, 2002). Set within a contextual background of public sector procurement, the model concentrates upon two polarised components – operational boundaries and sociological interaction.

3.2 Investigation of published research aggregated from elements applicable for framework agreements

A literal review has not identified any established directly comparable literature arising from research undertaken with framework agreements, reflecting that use of formal framework agreements within the public sector is a relatively new phenomenon. The first recognisable UK structured frameworks were advertised through a contract notice within the Official Journal of the European Union (OJEU) in 1995 (BAA, 1995). Objectives from this framework involved capturing resources and commitment from suppliers for delivery of a major infrastructure project (Terminal 5, Heathrow Airport). In return, contractors would be granted exclusive access to long term agreements for the supply of construction services. Predominantly reimbursed upon a 'cost plus' basis set against agreed targets required a high risk acceptance of liability from the client in return for strong team involvement. Although the Terminal 5 project was regarded as successful by the client as timescales were prevalent, use of a procurement method of 'cost plus' did not provide detailed cost benchmarking data for further analysis.

Public sector use of frameworks arose through an initiative by the Highways Agency (Highways Agency, 2001) as an attempt to secure long term resources for a programme of maintenance and improvements to the motorway and trunk road network within the United Kingdom. The initiatives included establishment of 'construction management frameworks', with suppliers collated into select lists for future projects. Suppliers would then tender for individual projects in a traditional manner from the select list. Apart from securing suppliers to undertake projects, the Highways Agency frameworks sought to gain improvements in performance through longer term relationships and closer working between project supervisors and suppliers. The Highways Agency construction management frameworks commenced in 2002 and completed in 2009. Perceived a success by the Highways Agency, empirical information is available through a pilot project undertaken within the framework from a supplier's perspective (Amey/Mouchel). The information (Ansell *et al*, 2009) provides an insight into relationships between a single main supplier and a single supply chain (sub-contractor) but does not investigate relationships between a multiple supplier framework or interactions between suppliers and a client.

The procurement performance model selects critical elements constructed from an aggregation of sociological and operational factors identified from within the case study and relevant to the construction process. Contextual positioning governing selection of elements is guided by propositions and theories from project performance and construction management practice set within public service. Literature pertinent to professional practice, sociological groups and behaviours of government client organisations is therefore considered appropriate to this study. The performance model takes theoretical perspective from five research areas:

- Human interaction by reference to sociological studies.
- Use of research into group behaviour theories.
- Recognition of organisational cultural within framework agreements and the importance of sociological groups.
- Operational procedures to capture data through performance measurement.
- Reference to economic theory related to procurement systems.

The five research areas fall into two distinct groups – sociological group behaviours, and operational methods and economic drivers.

PART A: SOCIOLOGICAL GROUP BEHAVIOURS

3.3 The use of social psychological studies for construction groups

A successful project requires efficient and effective mobilisation of resources to produce a positive outcome. Operation of supply chains ultimately results in a single resource – that of a person undertaking a task. Ergo, a direct correlation exists between individuals and groups making the interaction of human beings an appropriate source of literature at first instance. Social psychology has been defined as *‘the scientific investigation of how the thoughts, feelings and behaviours of individuals are influenced by the actual, imagined or implied presence of others’* (Allport, 1954, p 5). A particular strand of social psychology applicable to construction frameworks deals with behaviour of people, known as organisational behaviour. In this context, it is applied to professionals of a social class placed within groups.

3.4 Sociological context of literature relevant to organisational groups

In sociological terms, participants of construction frameworks act as described by Wilder and Simon (1998) as an interaction based dynamic group. Members of interaction groups are distinguished between those sharing a common bond (attachment between members) and those sharing a common identity (a direct attachment to the group). From characteristics described by Prentice *et al*, (1994), it is possible that both conditions can apply within frameworks at the same time – through an attachment between members due to professional cultural background or a direct attachment to the group itself as members of the framework forum. This dynamic may fluctuate in strength according to maturity of team and strength of individual characters. Properties described by Prentice as the entitativity of a group, reflect displays of cohesiveness, distinct and unitary purposes. High entitativity groups have clear boundaries, are relatively homogenous and use structured internal controls. Lickel *et al*, (2000) recognised variations between different sociological groups but concluded through the research that engineering and construction operations would align with high entitativity outputs.

3.5 Theoretical impact upon group performance and individuals

A review of literature investigating teamwork between individuals and the effect upon group performance indicates two competing relationship theories. These are:

- The ‘similarity-attraction’ paradigm taken from the field of social psychology where individuals perceptions of others, frequently inferred on the basis of similar attributes providing attraction among team members (Wiersema and Bantel, 1992; Smith *et al*, 1994). According to this paradigm homogeneous teams where individuals share characteristics such as age, profession, gender, culture and the like are likely to be more productive and focussed toward performance due to a mutual attraction of similar characteristics. Wiersema and Bantel (1992) found through empirical observation that homogenous teams shared language among individuals which enhanced communication frequency and integration. This improved performance where tasks required coordinated activities from team members.

- A ‘cognitive resource diversity’ paradigm developed through the field of management theory argues that diversity between team members creates an environment for positive performance due to individual unique cognitive traits (Hambrick *et al*, 1996). Supported by Simons *et al*, (1999), observations found that individual diversity added to the quality of debates and gave a positive impact upon team decisions.

The apparent conflicting theories do not assist with congruence of individuals towards group performance - but a deeper analysis of the published literature affords some guidance upon usage within a construction environment. Bunderson (2003) examined the collective functional expertise attributed towards each group and allocated certain traits toward a particular paradigm. Lant *et al* (1992) found that functional homogenous teams comprising experts relevant to an industry provided a positive relationship where performance would improve. On this basis it would appear that individuals comprising construction professionals lean towards the ‘similarity-attraction’ paradigm where an individual’s performance and group performance align (Horwitz, 2005).

3.6 Key elements of group behaviour theories

Traditional behaviour theory directly linked performance to financial payment (Taylor, 1914) where human production is proportional against pecuniary gain. This simplified view was added by development of behaviour theories following investigations into human relations in the workplace by Henry Dennison and Elton Mayo. A shift from Taylorist views toward more complex relationships between individuals followed Mayo’s studies at the Hawthorne plant of Western Electric. Mayo’s conclusion of individual alignment with group performance was that:

‘It is at least evident that the economists’ presupposition of individual self preservation as motive and logic as instrument is not characteristic of the industrial facts ordinarily encountered. The desire to stand well with one’s fellows, the so called human instinct of association, easily outweighs the merely individual interest and the logical reasoning upon which so many spurious principles of management are based.’ (Mayo, 1949, p 39).

Dennison held similar views to Mayo by recognising significant influences on groups caused through long term relationships and the fear of unemployment. He proposed that removing the fear of unpredictable employment allowed the utilisation of affirmative forces of pride (satisfaction), team spirit and loyalty (relationships), and emulation (group motivation and incentives) (Dennison, 1925). This was reinforced by further studies (Dennison, 1931) where influence upon output performance required an intrinsic mix of non-financial incentives, satisfaction, motivation and economic incentive. Proviso to Dennison's conclusions was the essential presence of a strong relationship between group members. Cohesiveness with individuals in the workplace was also supported by Cox and Blake (1991) who stressed:

'A core of similarity among group members is desirable but the need for heterogeneity, to promote problem solving and innovation, must be balanced with the need for organisational coherence and unity of action, (p 51).

Following establishment of 'organisational engineering' suggested by Dennison and Mayo, socio-psychological studies focussed upon separate elements of behaviour and a literature review of these are examined with particular emphasis to those applicable for the construction process. Traditional group behaviours of motivation, satisfaction, relationship and incentives suggested by Mayo and Dennison are explored by more recent contemporary behaviour research topics of motivation, trust, culture and power (Walker, 2011, p viii).

3.7 Influence of culture upon organisational behaviour

Concept of culture has a number of definitions arising from a variety of literature according to context and placement. Tylor (1871) provided a classic notion of culture as '*Culture . . . is that complex whole which includes knowledge, belief, art, morals, law, custom, and any other capabilities and habits acquired by man as a member of society*'. Organisational culture is manifested by the typical characteristics of an organisation through the deeply rooted values and beliefs that are shared by individuals within an organisation. Ogbonna (1992) described organisational culture as '*the interweaving of an individual into a community and the collective programming of the mind that distinguishes members it is the values, norms,*

beliefs and customs that an individual holds in common with other members of a social unit or group.'

The importance of organisational culture was recognised by Hofstede (1997) who developed a model to portray four layers of notional culture, by recognising symbols, heroes, rituals, and values. The model, known as an onion diagram (Figure 3.1), displays differing layers of culture across the organisation and indicates levels of practice with an organisation.

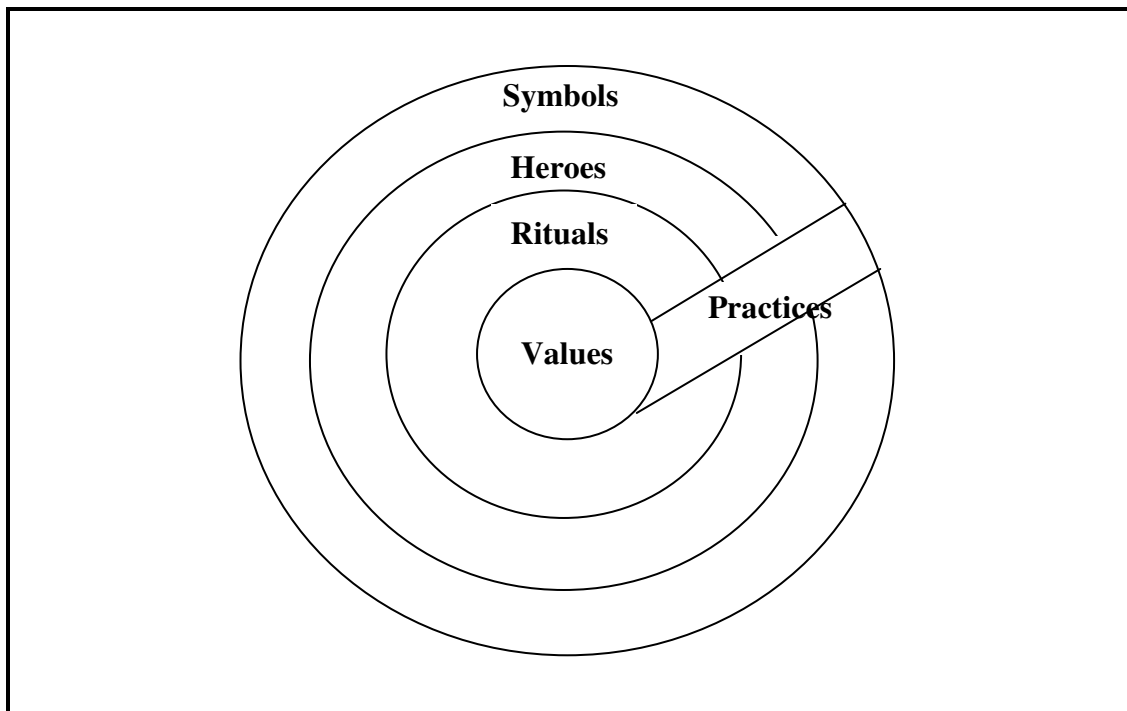


Figure 3.1: The Onion Diagram: Manifestations of culture at different levels of depth (Source: Hofstede, 1997, p9)

3.8 Importance of organisational culture and relevance to this research

Campbell *et al* (1999, pp47-48) suggests that organisational culture has an effect upon motivation, productivity, efficiency, innovation and creativity of participants within and affected by the organisation. Research undertaken by Brown (1995) supports the performance improvement element available to those organisations which change organisational culture to match markets, and cites two companies (IBM and Hewlett Packard) as examples of success. In addition to performance attributes, Brown recognised use of organisational culture as a management tool for control. The control aspect was also recognised by Hellriegel *et al* (2007) during observations made with research into organisational culture and productivity.

Organisational culture is transient in nature and is affected by and interacts with the environment within which it operates (Smith, 2003). Within a public sector environment, a shift was detected by Buchanan and Huczynski (2004) where organisational culture moved from a bureaucratic structure to humanistic hierarchies. Reaction of organisation change through external influences is a key component of an active and dynamic expression of culture (Fellows and Liu, 2002) and is particularly relevant to this research. The ability for an organisation to change in order to gain improvements in productivity was also an essential requirement suggested by Egan (1998).

3.9 Links between organisational culture, behaviours and performance

The link between organisational culture and productivity/performance is supported by a substantial number of studies identified thus far. Recent research places a progressive stratification of interaction between culture, behaviour and performance. Tellis *et al*, (2009) stated that culture drives behaviour for groups at a cognitive level using standard procedures. Zhang and Liu (2006) sought to construct a ‘culture – effectiveness’ model where culture provides motivated behaviour in order to increase performance with Chinese contractors. As stated by Walker (2011, pg 182) ‘*research on the impact of culture on organizational performance is mixed*’ and although Walker cites examples from a range across the cultural spectrum, no definitive conclusions are stated.

Although culture has an influence upon behaviours, reflection with the difficulties of analysing culture encourages investigation into characteristics of behaviour which is supported through significant empirical research. A review of the published literature places behaviours as a driver for group performance and in reflection of this, organisational behaviour forms the sociological drivers for performance.

3.10 Identification of organisational behaviours

A literary review of collaborative centric performance based groups identified characteristics that contributed positive results in outcomes (Katzenbach, 2000). Ten significant characteristics identified by Katzenbach were reconfirmed Akdemir, *et al*, (2010) who ranked 26 characteristics into the most effective ten behaviours. The ten behaviours are collated in Table 3.1.

Table 3.1: Ten most significant group behaviours

Behaviour	Emphasis	Literature source reference
Communication	Improved communication enables groups to raise performance level	Greenberg & Baron (2003: 200)
Trust and confidence	Distribution of fairness with group participants	Culyer (2001)
Empowerment	Decision making process delegated to individuals	Green (2002)
Effective incentive system	Non- financial and financial reward methods	Eriksen (2001)
Diversity	Mixture of group participants and geographic locations	Milakovich & Gordon (2001)
Motivation	Practice of providing purpose and direction to behaviour	Greenberg & Baron (2003)
Knowledge transfer	Tacit knowledge shared between group participants	Keskin (2005)
Relationships	Breaking down barriers and focussing upon group rather than individual outcomes	McCann (2004)
Satisfaction	Achievement of group goal setting	Fischman, <i>et al</i> , (2004)
Decision making	Critical thinking and conflict resolution skills required for ethical decision making	Fischman, <i>et al</i> , (2004)

As a pilot study to aid with recognition of behaviours within this case study, ten characteristics from Table 3.1 were shown to 20 participants. The participants were asked to choose, in their opinion, four most significant group behaviours that contribute performance to framework agreements. The questionnaire is shown in Appendix 4 and results of the pilot study are shown in Figure 3.2.

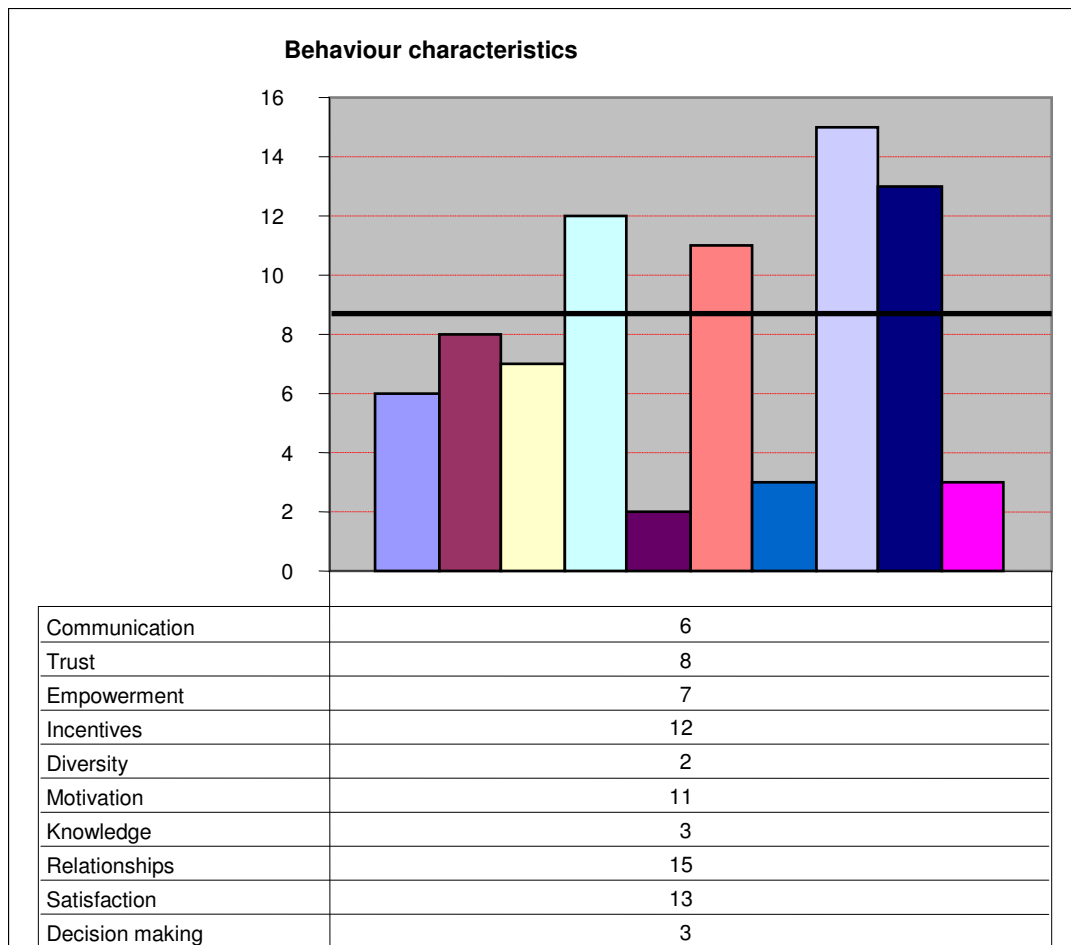


Figure 3.2: Results from pilot study regarding group behaviours

Pilot study views collated from participants indicate that motivation, satisfaction, relationships and incentives are the four most effective behaviours in gaining performance outcomes. These four are included in the proposed performance model. Each behaviour is considered further in context with published research.

3.10.1 Motivational theories

Motivation is the driving force by which individuals, groups and organisations achieve their objectives and goals. Intrinsic motivation relates to internal motivational forces such as individual desires, beliefs and achievements whereas extrinsic motivation recognises external forces such as financial incentives, competition and rewards (Gardner and Lambert, 1972).

Within the construction industry, specific studies have been undertaken to understand drivers of motivation and determine factors that can be used to increase production

and affect satisfaction. A study undertaken with 370 construction operatives working on sites in Turkey found a number of motivating/de-motivating factors which are summarised in Table 3.2.

Table 3.2: Adapted from motivation factors by Parkin *et al* (2009)

Context	Motivating factors	De-motivating factors
Financial	Earning enough money	Not earning enough money
Satisfaction	Enjoying the work	Not enjoying the work
Relationships	Good relationship with colleagues	Poor relationship with colleagues
Life balance	Enjoyable home life	Bad home life
Responsibility	Given high levels of responsibility	Lack of belief from others
Expectancy	Acknowledgement of effort towards targets	
Environment		Bad working conditions

The research conducted by Parkin *et al* (2009) found that the largest single motivator/de-motivator was financial – 67% viewed payment as the most effective motivation factor with achievement ranked second place (7%). Being paid too little was the largest de-motivation factor identified by 23% of those surveyed, with poor relationships, lack of enjoyment and bad home life accounting for an equal rating of 14% each.

Moving away from operatives to group behaviour, two studies investigated motivational drivers of professional teams (Rose and Manley, 2010). Analysis from four Australian projects concluded that although financial incentives were important, future work opportunities were also significant motivational factors. Group dynamics recognised by Rose and Manley are supported by Oyedale (2010), using four extrinsic motivational reward factors within architectural and engineering design teams. These are favourable project working conditions, organisational support, design process efficacy and effort recognition.

3.10.2 Satisfaction

Study of an individuals need for satisfaction arising from completed tasks was established following the pioneering work of Henry Murray (1938). Within groups, two contemporary theories may be used to examine self-concepts, the Optimal Distinctiveness Theory (Brewer, 1993) which provides a model of well-being within group contexts, and the Self-determination theory (Deci and Ryan, 1991) which is relevant to personal thriving within groups. Formal groups (officers, defined objectives and regular progress meetings) introduce stronger norms and higher expectations of their members whereas informal groups (friendships, hobbies, interests) provide less structure and lower expectations of members. Investigation of the effect of satisfaction experienced by construction professionals, and relationships within groups with performance was undertaken by Leung *et al* (2008). In summary of this work, the authors concluded that contributions from an individual and the role within a group were variables influencing effective commitment and performance.

3.10.3 Relationships

Relationships between different groups have been the subject of sociological studies for a significant period of time. Fiske (1992), developed a relational theory for groups that recognised social cognitive structures representing knowledge with attributes and stimuli. Further research provided four models to which all cultures are stated to comply (Fiske and Haslam, 1996). The four models are:

- Communal sharing – the group is more important than the individual
- Authority ranking – a linear hierarchy
- Equality matching – a balanced social exchange
- Market pricing – a sense of proportional outcomes

In addition, such groups will fit with legal, political and economic systems considered normal within a particular environment (Cohen, 2001). Construction groups are formed for a specific purpose and the communal sharing model appears to provide a close match with this relationship cognitive structure.

Aside from social interaction included within psychological research of group relationships, length of relationship is a factor to be considered. The UK construction industry has been traditionally driven by commercial considerations where a lowest priced tender is selected as the economic norm (Biggart and Hamilton, 1998). Application of this doctrine results in a constant mix of clients and suppliers preventing long term understanding of one another. Contrast with the Japanese building industry is marked Bennett *et al.* (1987). Cultural ties between clients, Japanese contractors and subcontractors often spans decades, where commerce is conducted through etiquette and custom. Improvements in quality, productivity, standards, and the like, form a significant part of the relationship (Bennett, 1991). Organisations embodying a culture of long term relationships display behaviours which contrast with who undertake discrete transactions. Such distinctions were recognised by Ganesan (1994) in Figure 3.3. Organisations using a short-term culture focus upon objectives and outcomes of the moment, whereas those with long term relationships achieve goals through both current and future outcomes.

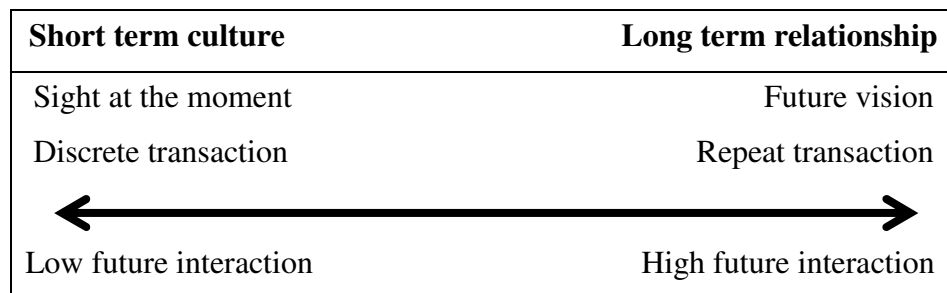


Figure 3.3 Contrast in behaviours of firms – discrete verses long term relationships (adapted from Ganesan, 1994)

Integration between organisations who wish to establish long term relationships follow five stages of maturity (Lockamy and McCormack, 2004) as indicated in Table 3.3.

Table 3.3: Five stages of relationship maturity (developed from Lockamy and McCormack, 2004)

Stage	Description	Symptoms
1	Ad-hoc	Unstructured and ill defined, management practice imported
2	Defined	Structure for relationships but old practices remain
3	Linked	Strategic relationships developed and collaboration between organisations begins to cultivate an atmosphere of trust
4	Integrated	Relationships embedded in commercial transactions and corporate investment benefits from efficiency and effective interdependency
5	Extended	Joint relationships are strong enough to compete against other organisations and success is linked to collective operations

Whilst the relationship maturity model proposed by Lockamy and McCormack (2004) relates to research within an industrial manufacturing context, performance opportunities are applicable to the construction process. Meng *et al*, (2011) proposes a four stage maturity model specifically for use with construction organisations to measure and improve relationships, and by extension gain improvement with performance.

3.10.4 Incentives

Payments of bonuses to operatives, measured against out-turn productivity targets has historically been a popular method of incentive. Studies concerning operation of incentive methods confirmed financial benefits to contractors – those operating bonus schemes for operatives achieved higher levels of productivity per unit cost when compared with those contractors that did not (Reiners and Broughton, 1953). Other incentive mechanisms came under investigation. Fleming (1967) concluded that productivity improvement in house building projects could be achieved by use of contract procedures or by careful tailoring the size of contract packages to match industry capabilities. Bresnen and Marshall (2000) found that financial incentives

coupled with advanced contracting methods could improve commitment and motivation within projects. Although financial incentives predominate, incentivisation between organisations may also operate at a socio-psychological level. Collaborative working involves commitment from suppliers without reciprocal guarantees of work from clients (Hughes *et al*, 2006) – and yet these arrangements encourage strong motivation through continued relationships. A resume of key incentive systems are given in Table 3.4 summarised from research undertaken by Rose and Manley (2010).

Table 3.4: Key incentive systems (adapted from Rose and Manley (2010))

	Financial incentives	Performance incentives	Mixed methods
Measurement	Use of target cost contracts where incentive is applied to the difference between actual costs and the target sum	Set key performance indicators which are monitored through the project life cycle	Combines target cost methodology with key performance targets
Reward allocation	Share ratio agreed within the contract documents	Financial bonus payment	Aggregate of financial savings and bonus payments
Incentive variables	Profit or loss sharing is based upon a shared profile aligned with the risks for each contract	Benchmarking and comparative outcomes related to performance	Significant number of combinations used to calculate the final outcome payment
Positive attributes	Encourages parties to work together to reduce costs	Incentives can be aligned to project priorities to improve supplier performance	Flexible method of ensuring all areas of performance are included within the incentivisation system
Negative attributes	Focuses upon cost rather than other areas to a project	Requires strong management structure with significant set up and maintenance costs	Quite complex to administer and conflict of results may be contentious

Table 3.4 illustrates the complex arrangements that incentives may form. Effectiveness with incentives depends upon cultural values of recipients. Ganesan (1994) found that short term culture firms react to financial incentives through quick gains - a single highly priced project, for example. Conversely long term relationship firms maximise income opportunities through strategic growth over many projects.

PART B: OPERATIONAL METHODS AND ECONOMIC DRIVERS

3.11 Economic theory related to construction procurement

Construction, as a process, is one of the most fundamental requirements for human existence. Design and construction of buildings, monuments and infrastructure represent different stages of civilisation defined by boundaries of technological capability through the use of materials. At a basic level, the need for shelter by humans is secondary only to a requirement for food and drink. The oldest recognised human constructed structure has been dated between 200,000 and 400,000BC at Terra Amata in France (Villa, 1983). Earliest examples of organised construction activities involving large numbers of people and extensive resources, coming together in a structured way to produce large scale projects for use other than shelter date to around 3,000BC. The Great Pyramid of Giza located near the entrance of the Nile Delta was constructed as a monument to glorify deceased pharaohs. Although Greek literature suggests that a number of pyramids have been built using forced captive 'slave' labour, archaeologists Zahi Hawass and Mark Lehner found evidence of organised cemeteries and workers camp sites indicating the presence of welfare facilities. Re-examination of ancient records concluded that design and construction methods were highly organised. Labour and other resources were organised to be in the right place at the right time – an early equivalent of construction programming. Stone, timber and other materials needed acquisition, shaping and transportation. Although some forced labour would be involved for simple manual tasks, skilled artisans and planners could not be engaged in such a fashion. A system of payment was needed to reflect commitment to a project. For the pyramids, it is believed that payment for skilled operatives was usually 'in kind' by gifts of food, clothes or accommodation rather than an exchange of money or tokens. At a higher level of importance, designers and surveyors were offered gifts that included gold and

precious stones to reflect effort made by key individuals. (Altenmuller and Moussa, 1991, p36). Although principles of modern economics are not present with this early civilisation, a link between productivity and reward was recognised.

3.12 Use of monetary selection systems within construction

Historical records indicate that use of resource allocation by payment in kind or time based monetary payment continued for almost 5,000 years but was not without its problems. Payment through reimbursement of time based methods included an allowance for mark up which reflected a benefit to undertake the work. It can be viewed as an incentive to provide a service (supply) to someone who wishes it to be undertaken (demand). Modern economic theorists understand the variability of a mark up allowance in reaction to market conditions (Harvey and Jowsey, 2007). Tah *et al*, (1994, p31) described mark up by relating it to the costs of a construction project. He stated that *'direct costs of a project comprise labour, plant, materials and sub-contractor costs. Indirect costs consist of site overheads, general overheads, profit, and allowances for risks. When indirect costs exclude site overheads they are often termed the mark up.'* Although this description provides a cost driven view of a project, economic forces often dictate prices otherwise.

Payment by resource has been a method of reimbursement for several millennia and is still occasionally used by some clients, but does suffer a flaw with the control of productivity. If operatives are paid per day for example, there is no incentive to finish a project early. Projects undertaken using a resource method of payment are often difficult to calculate due to uncertainty with the construction period. Concerns from clients requiring construction services are not new making the role of estimator essential. An early example of concern appears in the Bible, as Jesus states:

'Suppose one of you wants to build a tower. Will he not first sit down and estimate the cost to see if he has enough money to complete it? For if he lays the foundation and is not able to finish it, everyone who sees it will ridicule him, saying 'this fellow began to build and was not able to finish.'' (Luke 14.28-30).

As sophisticated building techniques developed, shortage with skills became acute. Market trade guilds formed in the fifteenth century to meet demands of specific

projects and control the price obtained for work by restricting supply. Trade guilds controlled the market by ensuring tradesmen were paid by each piece of completed work (hence the term 'piece work'). A single event occurred in London in 1666 that would exaggerate a shortage of skilled resources and emphasise a lack of control over market prices further. The great fire of London provided a need for major reconstruction work requiring scientific control of cost estimates and use of standard methods of measurement to assist with the rebuilding programme. To estimate the value of work, a guide was produced which also assisted with the calculation of timescales and costs for specific elements of a project. This guide, regarded as the most significant treatise of its time was '*A platform for purchasers, a guide for builders, a mate for measurers*' (Leybourn, 1672). The ability to relatively accurately estimate construction projects and determine standard methods of measurement formed the basis of modern quantity surveying methods still used today. Publication of Leybourn's guide also enabled both suppliers and clients to agree a range of 'fair market prices' when disputes arose.

The use of payment by piece work developed further as the industrial revolution progressed. Nonetheless, elements of resource based and piece work estimating continue to be used in modern construction economics.

3.13 A continued lack of cost certainty and rise of tenders

Although piece work helped with certainty of costs, there was still a lack of cost certainty so an independent measurer prepared standardised schedules for a building project, where all of the significant construction materials, labour activities and the like were quantified. This method of construction payment (the bill of quantities) is still in use today for a significant number of construction projects and represents an aggregate of elements (Carr 1989).

Lump sum tenders using bills of quantities remained the predominant economic measurement system until the turn of this current century. More recently, there has been a move away from bills of quantities to other forms of evaluation. An analysis of procurement methods of civil engineering projects undertaken by the Civil Engineering Contractor's Association (CECA, 2002) identified that between 1999 and 2001, traditional procurement methods using bills of quantities for discrete projects reduced from 55% to 37% whereas partnering and framework procurement

methods increased from 38% to 55%. The results are shown graphically in Figure 3.4.

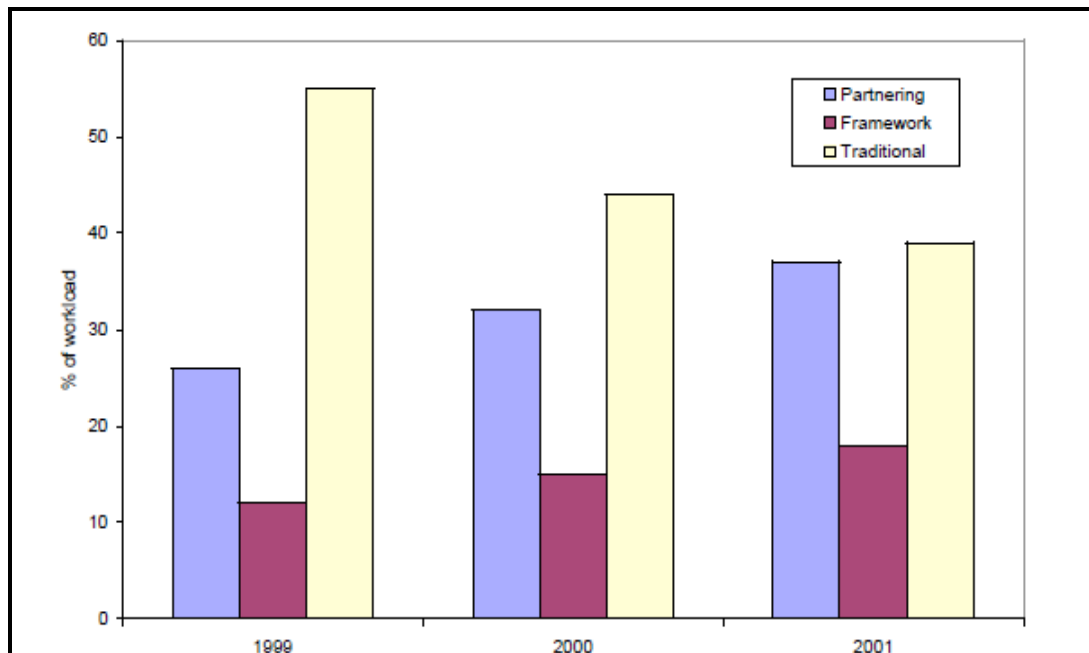


Figure 3.4: Changes in procurement methods between 1999 and 2001 taken from page 8 of *Supply Chain Relationships in the Civil Engineering Industry* (CECA, 2002)

3.14 Introduction of partnering and collaborative methods

Sir Michael Latham described partnering as an arrangement where '*the parties agree to work together, in a relationship of trust, to achieve specific primary objectives*' (Latham, 1994, p62). Such arrangements consist of:

- A standard form of construction contract supplemented by a separate charter. The charter is an arrangement consisting of non-binding statements outlining common objectives and grievance procedures. If either party does not adhere to the charter, it is not a breach of contract.
- A partnering contract such as the ACA Standard Form of Contract for Project Partnering (PPC2000). Often described as a partnering agreement rather than partnering arrangement, failure to comply with relational

concepts contained in the contract may constitute a breach of conditions which can be actioned at law.

The move toward collaborative arrangements continues but the pace of change appears momentous. Partnering agreements accounted for 2.7% of all building contracts in 2004 and this had reduced to 2.3% by 2007. Framework agreements, by contrast did not appear in the 2004 survey, but by 2007 accounted for 4.5% of the number of the contracts used (RICS, 2010). It would appear that partnering has already been replaced by framework agreements.

3.15 Relationship between procurement, tendering and contractual arrangements

Procurement is a method of buying goods and services (Hackett *et al*, 2006) and comprises an engagement process from invitation of a supplier up until signature of a contract. Within construction, Hughes *et al*, (2006) recognised two broad classes of procurement – traditional and competitive or innovative and collaborative. The choice between each class or variation between procurement choices is primarily determined by risk allocation of the client. At one extreme a client may choose to accept all risks regarding cost and reimburse a supplier on a cost plus mark up basis. The opposite position places all risks with a supplier for a fixed lump sum price. Whilst allocation of risk is a prime concern, other criteria are used when clients choose a procurement strategy. Murdoch and Hughes (2008, pp88-93) identify these as:

- Certainty of price
- Programming requirements
- Complexity of the project
- Separation of design from construction
- Flexibility of specification
- Client's involvement with the process
- Client's contractual viewpoint

Supporting procurement strategies are tendering procedures and contractual arrangements. Traditional tendering, when set within a context of public

procurement, focussed upon obtaining the best price through market economics (Friedman, 1957). It has been recognised that acceptance of the lowest bid does not always represent good value. This is due to extreme economic conditions that encourage suppliers to ‘under bid’ (bid below actual cost) when workloads are low, or ‘over bid’ (increase mark up values) when work is plentiful. Murdoch and Hughes (2008, p130) recognised this phenomena by distinguishing between a lowest tender price submitted by suppliers and the actual price for the work – the latter usually being higher than the lowest bid. This problem has also been recognised for a considerable time with public sector tendering. The Placing and Management of Building Contracts (Simon, 1944) recommended less emphasis upon onerous tendering processes and warned against always accepting the lowest price.

Contractual arrangements comprise a form of contract, risk apportionment and payment methods. These form the basis of an agreement between clients and suppliers – and this agreement is often are linked further down the supply chain to sub-suppliers. Development of new procurement methods rely upon availability of legal documentation and subsequent understanding by the industry in order that changes may occur. Use of legal forms of contract which clarify risk allocation and encompass management techniques was a requirement for change suggested by Egan (1998). An industry response was the New Engineering Contract which introduced a framework contract at the 3rd Edition (2005). Adoption of this form by the construction industry has allowed the use of framework agreements to expand as reflected by the RICS survey (RICS, 2010).

3.16 Construction economic and market competition theories

An investigation into drivers of construction price determination and economic forces has discovered two predominant areas of literature.

One view, often described as traditional, applies a probability approach. Individual construction elements of cost are calculated at net and a supplier then applies a ‘balancing adjustment’ to arrive at a tender price based upon the likelihood of winning the project. Known as tendering theory, this approach was proposed by Friedman (1956) and has subsequently been supported by Gates (1979), Rosenshine (1972) and Fuerst (1976).

A second view follows a neo-classical theory of economic price determination applied to construction bidding methods but builds upon previous research. Suggested by Hillebrandt (1974) and confirmed by Runeson and Raftery (1998), this theory applies economic principles of supply and demand set within a perfect market status. Economic price determination assumes that the construction industry conforms to a model of perfect competition with a large number of suppliers where knowledge of market prices is available. Perfect competition relies upon market equilibrium where price is determined by interaction between suppliers and purchasers – the contract price is agreed at an interaction where purchasers achieve the lowest price whilst suppliers achieve the highest price available within the market. The effect of market conditions was described by De Neufville *et al* (1977) as a period of ‘good years’ from suppliers where profit margins are increased as a reaction to less intense competition, as opposed to ‘bad years’ with less opportunities where projects are bid at low profit margins or at cost. This process is manifested within the construction industry through tendering procedures where interaction between supplier (contractor) and purchaser (client) is achieved through tendered bids.

From public sector client perspectives, either price determination theory is embodied into procurement systems. The procurement process is heavily regulated through standing orders and statutory instruments where bids are confidential, sealed and only opened after a secure tender period. Traditional public sector procurement often requires the lowest submitted bid to be accepted unless exceptional conditions prevail (Flanagan *et al*, 2005).

3.17 Impact of frameworks upon a perfect economic market

A significant tenant of framework agreements is the reduced number of suppliers and a special relationship arising from closer links with a client. This is particularly relevant in public sector organisations where traditional procurement relied upon extensive select lists of suppliers from which tender lists are compiled. An example of this phenomenon is the organisation used for this research (Hampshire County Council) – prior to introduction of frameworks; the organisation had a list of 52 suppliers within a select list for civil engineering contractors. Selection for tender lists employed a combination of rotational and ‘past experience’ anecdotes. Each

tender list contained 6 suppliers and this was a typical number for UK public authorities. This contrasts with Hong Kong authorities who invited between 10 and 17 suppliers (Drew and Skitmore, 1992).

Concerns with costs of bidding for projects and a marginal opportunity of winning provides a considerable body of research literature (De Neufville and King, 1991; Holt *et al*, 1994; Remer and Buchanan, 2000). In order to reduce wastage with bidding costs, findings have suggested that tender lists of between 4 and 8 suppliers provide a balance between competition and bidding effort (Wilson and Sharpe, 1988; De Neufville and King, 1991).

Following microeconomic theory, the use of framework agreements creates an artificial barrier to a perfect market by restricting supply dictating that tender prices will increase as profit margins rise. Reduced market competition and an opportunity for suppliers to raise margins have not escaped practitioners or their clients. Questions about the economic efficiency of tenders received from suppliers within restrictive framework agreements have been voiced within construction media (Morgan, 2009). Although practitioners refer to such phenomena as a restriction to competitiveness, definitions of the effect are not clear within construction research. Competitiveness is often displayed through multiple layers of dynamic attributes and processes (Flanagan *et al*, 2005) and therefore this research concentrates upon a single entity of market operation – the tender price.

3.18 Market operation and the effect upon quality and the costs of quality

The costs involved with defects and rework in design and construction has formed a significant area of research (Abdul-Rahman *et al*, 1996; Barber *et al*, 2000; Love and Li, 2000). These studies generally have focussed upon the impact of costs arising from failure by a supplier, rather than the costs involved with contribution of prevention and appraisals in application of quality systems. According to Besterfield (1994) costs of quality are costs associated with non-achievement of a product to the required specifications and include prevention measures, appraisal actions, internal failure and external failure. A Prevention, Appraisal and Failure (PAF) Model developed by the British Standards Institute proposes an inverse relationship between prevention and appraisal effort and the cost of failure. Optimum quality performance

occurs at a point where the cost of prevention plus appraisal equals the cost of failure. The PAF Model is illustrated at Figure 3.5.

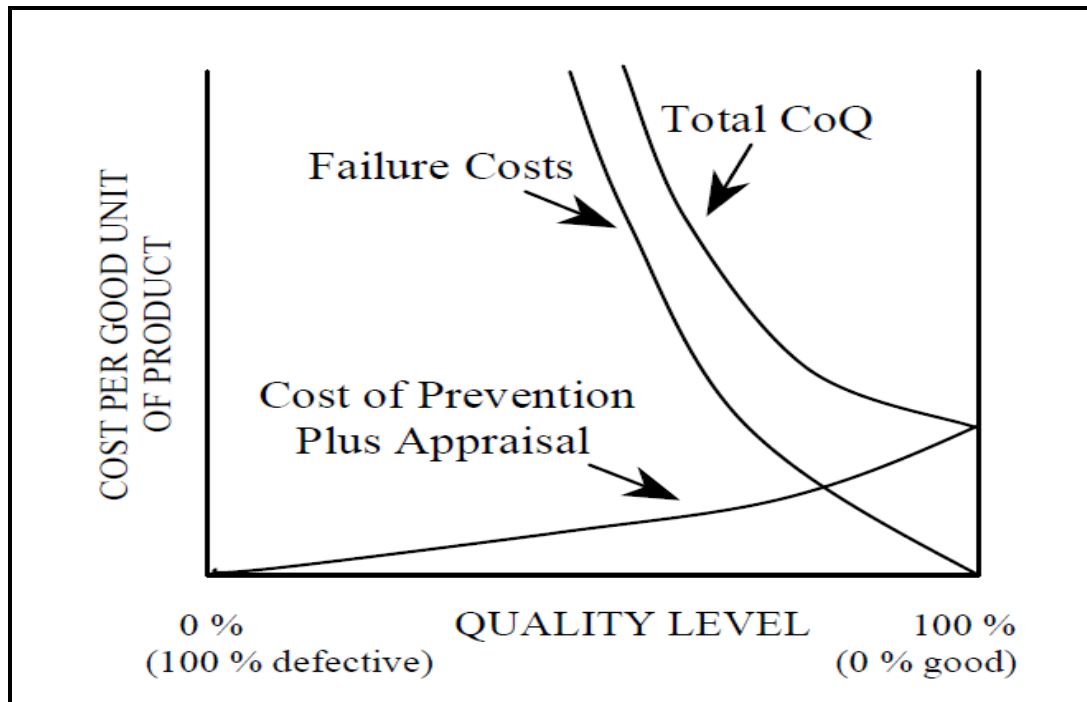


Figure 3.5: Prevention, Appraisal and Failure Model adapted from BSI (1990)

Not all research identifies such costs. Crosby (1979) asserted that ‘*quality is free*’ based upon the premise that lack of quality and remedial action increases costs. Juran (1988) added that costs concerning poor quality would disappear if products and processes were perfect. Both statements surfaced from research undertaken within the manufacturing industries where the cost of poor quality is estimated between 10% and 30% of total costs (Atkinson *et al*, 1991). Within the construction industry, few investigations have been made into the costs of quality but a study into residential construction projects in Dubai (Abdelsalam and Gad, 2009) revealed:

Cost of quality	1.3%
Failure costs	<u>0.7%</u>
<u>Total Cost of quality</u>	<u>2.0% of total project works costs</u>

Placing the above values into context of market competition, total cost of quality represents a marginal cost to a project and represents a lower consideration than a profit margin. As these values are not significant, an economic appraisal of quality costs has not been undertaken within this research. The importance of quality as a

success factor of a project is instead viewed using quality based outcomes compared between framework agreement projects and discrete projects.

Research into effects of competition upon quality levels and the inherent costs associated with maintaining quality for engagement of property and construction services by public sector organisations was undertaken Hoxley (2001). Findings reached as part of the conclusions to examination of responses from 189 public sector clients suggested that *'fee tendering has not led to a decline in clients' perceptions of service quality'* (Hoxley, 2001 p138). Whilst this underlines the financial insignificance of costs involved with quality Hoxley also concluded that *'public sector clients can positively influence the likely level of service received from their consultant by taking care with the pre-selection of tenderers'*. Hoxley's research is set within the context of service provision from professional firms rather than works provided by contractors. As the construction industry moves toward integration of roles where contractors provide services and works, Hoxley's views could be considered applicable to professions and contractors alike.

Summation of research upon the influence of quality upon cost is not conclusive due to differing measures and contextual positioning. Clearly the cost of defects and rework is sufficient to warrant further investigation elsewhere but for the purpose of the procurement performance model within this research, a contractual basis requires all work to be undertaken to the correct specification with completion to that standard. Quality performance metrics are measured in this research at completion and operational incentives – positive or negative - reflect these outcomes.

PART C: CONSTRUCTION OF PERFORMANCE MANAGEMENT MODEL

3.19 Construction of a performance management model - concepts

Construction research, represented by case studies where the interaction of participants and groups is being studied, is usually aided through graphical modelling using visual and logical patterns. Fellows and Liu (2008, pg 74) suggested that such models provided *'directions of relationships among the variables'*. Hofstede (2001) recognised that graphical models are by necessity subjective, but can attract criticism through oversimplification of a complex process. Nonetheless, such models are useful in providing a starting point to include key elements of research and provide a

logical progression with social systems. (Borgoni *et al*, 2009). This research is a complex process involving participants involved with over 150 projects, groups of highly qualified and experienced professionals; and financial sums exceeding £46 million. The performance model is designed to represent an overview of performance mechanisms involved with framework agreements during the tender and construction phases.

3.20 Construction of a procurement performance model – industry relevance

Construction suppliers are identified as short life organisations (Ankrah *et al*, 2005) where size (number of operatives, turnover) and market penetration (specialism's and developments) can change at short notice according to the economic climate. The organisational culture of construction organisations and the dynamic nature attributable due to short life existences is determined by project and industry characteristics, dominant management strategies and procurement approaches (Graves, 1986; Handy, 1993; Mullins, 2005). Such characteristics are:

- A dynamic approach to varying work loads, mergers and introduction of new suppliers into the market place. Suppliers have to be responsive to these changes by remaining fluid in structure and reactive with resources (Ankrah *et al*, 2005).
- Environmental conditions are placed in context by groups that are dominated by a particular occupation or profession and therefore the culture embodied by that group is transferred to the organisation as a whole.(Kotter and Heskett, 1992).
- Procurement approaches influence the organisational cultural of suppliers through attitudes toward trust, innovation, performance, commitment, collaboration and mutual advantage (Naoum, 2003).

3.21 From linear performance towards cyclical continuous improvement

A distinct feature of framework agreements is the prospect of linking multiple projects through longer term relationships between suppliers and clients (Egan,

1998). The model therefore displays cyclic properties proposed by Deming (2000). Deming integrated the Japanese concept of Kaizen into continuous improvement by allowing each rotation to provide a critical review of performance. A cyclic approach provides an opportunity to repeat procedures – namely examination, deconstruction, improvement plan, integration (Rijnders and Boer, 2004). Termed ‘agile supply chains’ by Christopher and Towill, (2000), focus is placed upon performance outcomes.

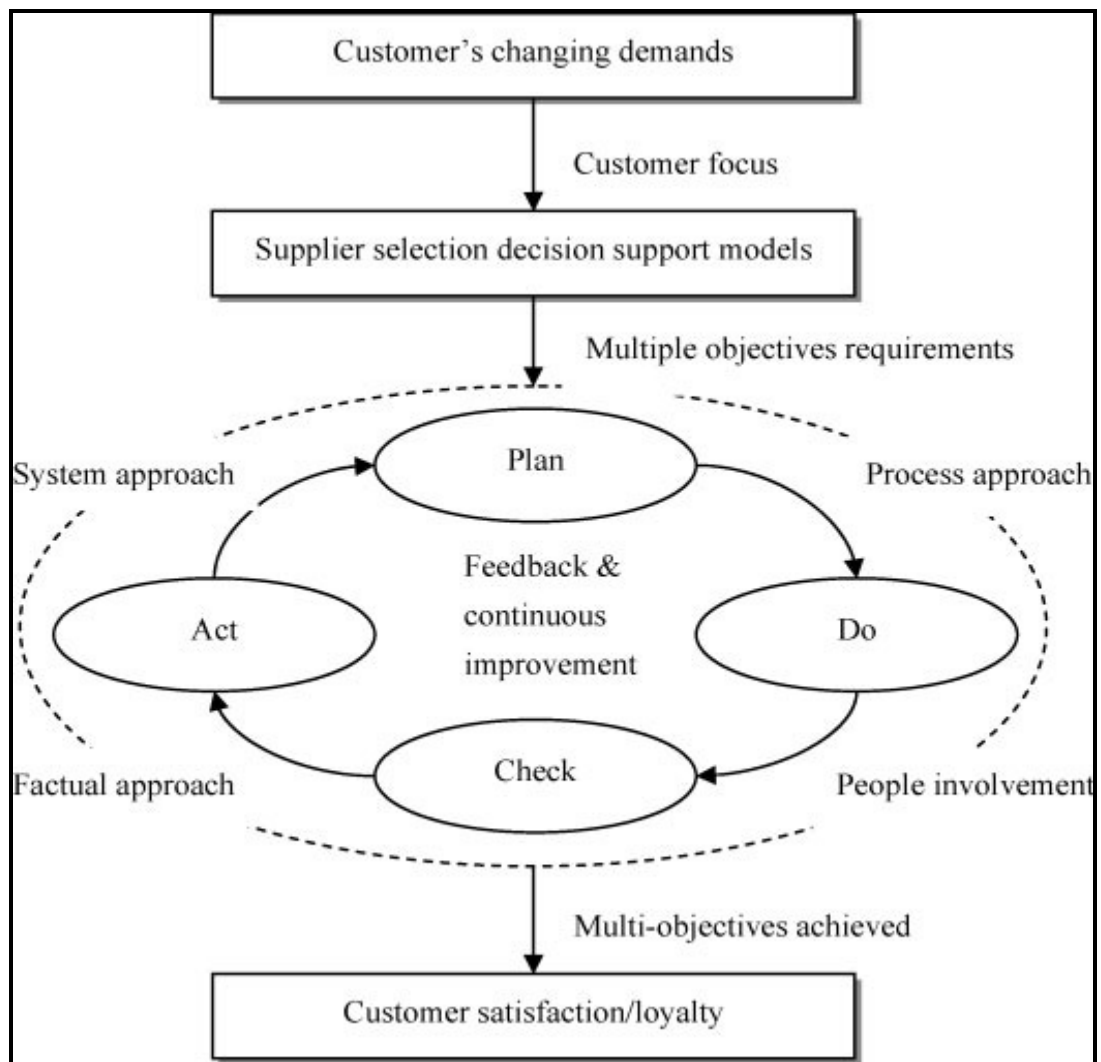


Figure 3.6: Continuous improvement model developed by Wu and Barnes (2009)

A continuous improvement model based upon Deming’s cyclical approach and adapted to include concepts of agile supply chains was proposed by Wu and Barnes (2009). In Wu and Barnes (2009) model (Figure 3.6), four principles of *examination*,

deconstruction, improvement plan and integration (Rijnders and Boer, 2004) are replaced by *check, act, plan and do*. Although this cycle was specifically developed for general manufacturing, emergence of long term relationships allows a potential application for the construction industry.

3.22 Construction of a conceptual performance management model for this research

Use of cyclic improvement method developed by Wu and Barnes (2009) but applied to performance measurement and management research provides a dynamic directional property to the performance model. Each component follows discovery of sociological group performance theories and performance management theories applied to the model:

- **A sociological construct** developed from group performance theories consisting of ten identified behaviours placed in a construction industry context.
- An **operational construct** developed from economic theories collated from collaborative working and performance management related toward measurement and operation of key performance outcomes.
- The focus of the procurement performance model is an impact of procurement drivers upon participants involved with the framework agreement.

The proposed performance management model is shown in Figure 3.7.

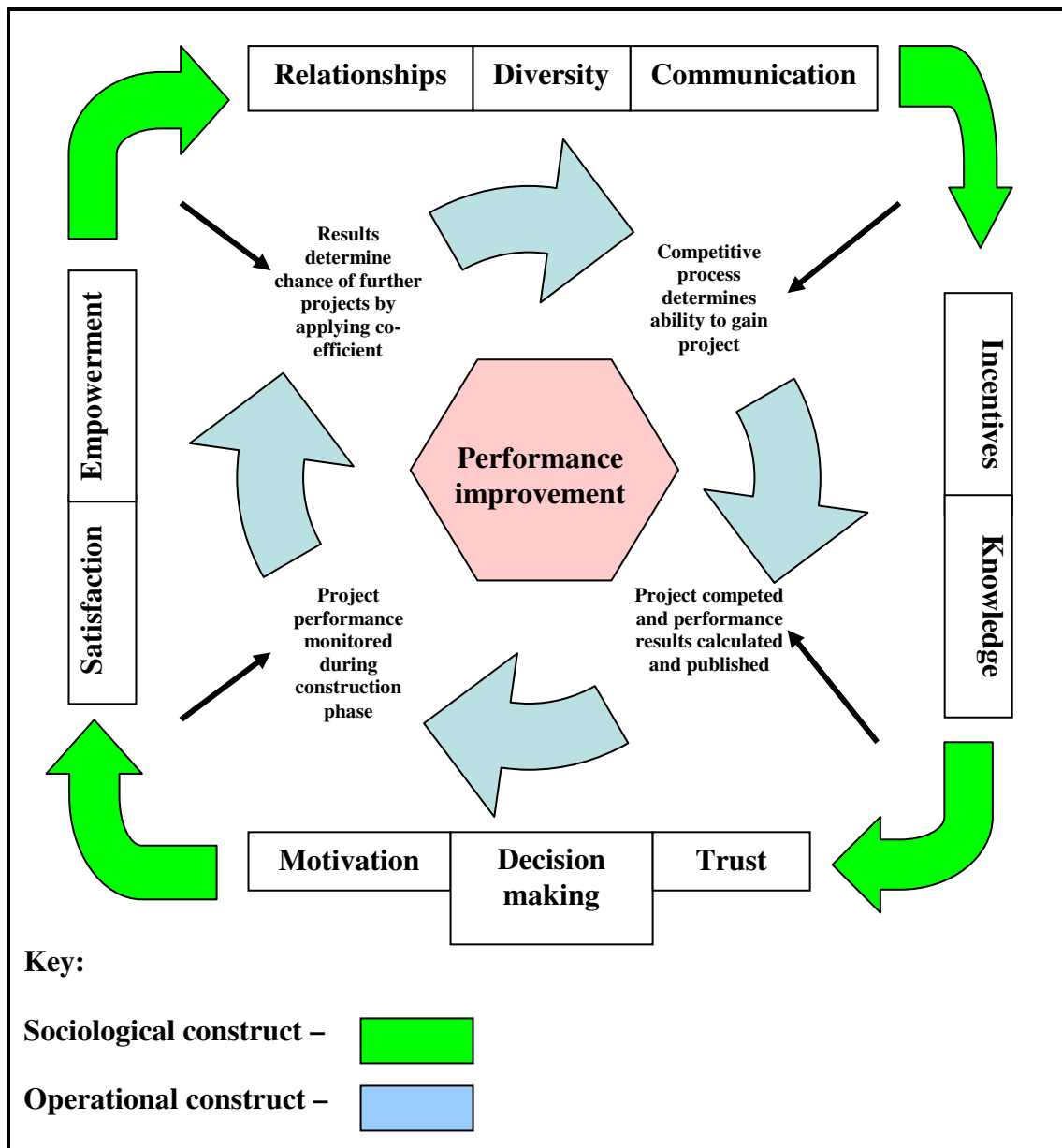


Figure 3.7: Proposed procurement performance model for improvement within construction framework agreements – *a priori*

3.23 Summary

The performance model displays a particular dynamic quality which drives in a single rotational direction. Although each area of theoretical construct appears independent, a cross matrix of influence exists – both in representational terms within the model and from areas of research. Each group characteristic acknowledges the role that cultural influence makes, thereby drawing links between the central core

and outlying behaviours. An emphasis to performance is reinforced by operational methods of measurement, reward and economic considerations. The model offers an advantage to suppliers that produce high levels of performance. Selection of a supplier for a future project relies upon a combination of tender value and past performance values.

The model will be used for framework agreement projects contained in this research and results of outcomes measured to deduce the effectiveness of such. A comparison will be made with projects undertaken without such a model in operation, namely discrete/traditional projects.

CHAPTER 4: HYPOTHESIS AND RESEARCH METHODOLOGY

4.1 Introduction

An extensive review of published research undertaken in Chapter Three has not revealed any directly comparable research specifically available for framework agreements. This is somewhat surprising given the extensive use of framework agreements within the public sector at this date. Although anecdotal claims of performance from supporters of framework agreements are available, these do not detail the extent or contextual positioning of such evidence. To provide a theoretical basis upon which to analyse performance improvement with framework agreements, a performance model was constructed in chapter three. The model provides a holistic view comprising components from:

- **the impact of behaviours on performance**
- **use of performance measurement on project outcomes**

in recognition to the cause and effect of dynamics anticipated from published literature.

Chapter four builds upon theories offered by the performance model by developing hypotheses from published literature, particularly those relevant to sociological groups of a technical class (such as construction professionals) and developed research for construction management performance management. In recognition of the professional element required by this thesis, alignment with current professional practice is undertaken through operational considerations. In essence this requires the research to interact with construction management at two contextual connections. The first revolves around understanding of practice data so that methods proposed in this chapter reflect practice. Examples of this are key contractual dates such as possession and completion. The research methodology is developed around such key data because this forms a strong connection with practitioners and being contractual, is a reliable data source. The second contextual connection is choice of paradigm placement. The predominant paradigm of this research is with construction management and therefore published research, where applicable, is related to this

discipline. As a practice based thesis, social convention, language and methods are allied to the construction management paradigm.

In this chapter, an approach to research methodology is developed from philosophical theories to those applicable for construction management. This allows development of hypotheses relevant to this study followed by proposed research methods. A discussion on the sample size, sources and reliability of evidence allows an overview of methods to be constructed with a summation provided at the end of this chapter.

4.2 Approach to research methodology

Remenyi *et al*, (1998) suggests that a researcher should consider and recognise the community and context within which they exist when deciding which research methodologies to use. A philosophical approach to epistemological and ontological assumptions should reflect the professional practice background and organisational context of the research. Epistemological assumptions concern origins, nature and limits of human knowledge and guides research methods used for study. Ontology may be used to question existence itself, and is concerned with the study of being and events (Coghlan and Brannick, 2005). Paradigms of research are shown in Table 4.1, placed in the context of research methodologies together with the effects upon a researcher.

Table 4.1: Research paradigms adapted from Coghlan and Brannick, (2005)

Philosophical background	Positivism	Interpretivism	Action research
Ontology	Objective	Subjective	Objective
Epistemology	Objective	Subjective	Subjective
Theory	Generalised	Specific	Specific
Reflexivity	Methodological	Encompassing	Epistemic
Role of researcher	Distanced	Close	Close

Recognitions of paradigms allow an investigation into methodologies suitable for the contextual position of this research.

4.3 Methodology applicable to construction management research

Within construction management, two communities or context methodologies dominate the research approaches – positivistic and interpretivistic (Love *et al*, 2002). A positivistic approach is defined by the view that '*an external reality exists and that an independent value-free research can examine this reality*' (Coghlan and Brannick, 2005). Positivism uses explanation from logical conclusions controlled by general laws. The laws are applied consistently using scaled measurements to determine extent of variations. Positivist research is neutral, detached from its setting and objective.

An interpretivistic approach places a researcher within the process, where observations are taken from collected data. Such observations may arise from subjective data which can be used to suggest general trends. If these trends are repeated, then a lawful relationship may be discovered and confirmed. Interpretivism uses experiences gained during physical events rather than the events themselves to provide relationship information (Fellows and Liu, 2008). When studying professional judgement, experiences and tacit knowledge are important facets that should be recognised through the interpretivistic process. Attributes of each of the three research paradigms from the perspectives of ontology, epistemology, relationships to theories, reflexivity of the researcher and role of the researcher is shown in Table 4.1 (Coghlan and Brannick, 2005). This research will be predominantly interpretivistic due to the close role of researcher and professional judgement/tacit acknowledgement recognition. A positivistic approach is taken as objective placement is collected through independent data sources.

4.4 Development of hypotheses for framework agreements verses discrete projects

The procurement performance model engages with operational and sociological theories involved in gaining improvement with project outcomes. This allows attention to be drawn toward specific contextual and substantive variables identified through this research. Collection of data on variables will allow effects of

performance on critical success factors to be measured for construction projects, thereby allowing a comparison between projects procured using traditional methods with those contained within a framework agreement. The paradigm used for capture of this data is through a quantitative study – controlled through a process of statistical comparison. Exploration of performance drivers from participant's views is through a qualitative paradigm with enquiry via questionnaire and interview to develop the procurement performance model.

The hypotheses are polarised into three distinct groups. In group A, an introspective view is taken to examine performance through outcomes of both framework and non-framework projects. Critical success factors are used to measure performance to determine if significant differences exist between the two engagement methods. Hypotheses 1 and 2, (H₁ to H₂) therefore concentrate upon performance outcomes. Group B takes an extrospective context with economic performance to investigate if claims regarding inefficiencies with framework agreements made by some practitioners are accurate. Hypotheses 3 to 5, (H₃ to H₅) examine output measures of financial performance between the two engagement methods. Group C (H₆) provides a hypothesis related to performance drivers detected by participants through views.

The hypotheses are:

Group A: Introspective examination of project outcomes:

H₁: Operational methods of framework agreements can significantly improve out turn performance of construction projects in respect of timescales, payments, defects and safety.

Measured outcomes from data collected from the case study projects for timescale and payment variations, extent of defects and health and safety inspections are calculated according to critical success factors defined and weighted by the client organisation. Analysis of individual components will allow identification of factors that have the most significant influence upon out turn performance and determine if significant differences exist between the two groups contained in the research – discrete and framework projects.

H2: Framework agreements can provide significant performance improvements compared with traditional discrete tendering methods in terms of overall project outcomes.

Overall project outcomes are derived from data collected from the case study projects – 164 in total (60 discrete and 104 framework) in relation to aggregation of critical success factors decided by the client organisation. Raw project data identified in hypothesis H₁ are collated from contemporary records and processed using defined calculations to arrive at values for factors. Aggregation of these critical success factors produces a project success index measuring an objective value of performance for each project. Comparison of results from the two groups are analysed to test this hypothesis. In addition to critical success factors and outcomes, an examination of project characteristics will be undertaken to determine if these affect performance measures.

Group B: Extrospective view of economic performance with framework agreements:

H3: There is significant difference in production costs between framework agreements and traditional tendering methods due to reduced competition.

Economic theory dictates that operation of a perfect market requires a large number of suppliers competing for selection in order to obtain the lowest possible price. Traditional procurement methods employed this economic proposition by using extensive approved lists with large numbers of suppliers in order to gain the lowest price as a benchmark of efficiency. According to analysis from central government reports in chapter one, this premise is flawed as it does not usually offer the best value overall.

Irrespective of views from government reports, reference to professional practice has identified that some practitioners feel that use of framework agreements restrict market competition, thereby increasing the value of tender prices. Hypothesis 3 follows perfect market economic theory in order to determine if tender prices are affected by the restrictive market offered by framework agreements. Comparison between production costs of different tendering methods is extremely difficult to

obtain because it would involve tendering the same project twice, once for each method. This position is unacceptable to both client and supplier due to the costs of tendering involved. So to provide an economic basis an examination will be made of both data sets to determine if there is any significant difference between the estimated values and tender values for projects to identify any 'step change' due to the engagement methods. Action research will also be applied to a selected single project using both traditional and framework engagement tender methods to compliment economic theory.

H4: There is no significant difference between engagement transaction costs of framework agreements and traditional tendering methods.

The literature review polarised views regarding engagement transaction costs of projects using traditional methods verses those undertaken with framework agreements. Supporters of framework agreements cite significant reductions in terms of engagement costs when compared with those required for traditional procurement. Opponents question the framework approach and argue that the cost of using complicated and extensive tendering procedures with mini competitions outweigh any savings made due to less initial engagement. To provide a comparative analysis, costs collected through the organisations extensive financial monitoring systems will be used for analysis.

H5: There is no significant difference between performance monitoring transaction costs of framework agreements and traditional tendering methods.

An extension of the argument used at hypothesis 4 examines the monitoring transaction costs of traditional projects contrasted with those for framework agreements. The polarised views used in hypothesis 4 extend toward operational data collection required during the construction phase. As identified during the literal review, collection of performance data should be relevant, simple and not onerous. Views range from those who find measurement of performance as not effective and costly, to those who see it as an essential part of the construction process. In order to provide data for analysis, costs collected through the organisations extensive financial monitoring systems will form the basis of comparison.

Group C: Identification of performance drivers detected by participants within framework agreements:

H₆: Performance outcomes are positively associated with sociological factors (behaviour factors) and operational factor (performance measures).

The procurement performance model constructed in chapter three displayed two significant constructs – sociological factors identified through ten ‘most significant group behaviours’ of effective performance taken from published research – and operational factors arising from identification and application of performance measures. Hypothesis 6 proposes that examination of qualitative data through questionnaires and interviews produces a generalised correlation with positive project outcomes.

4.5 Research sequence applicable to construction management research

This research will adopt a sequential four phase approach suggested by Fellows and Liu (2008):

1. Extent of the problem has been recognised through reference to published UK government reports between 1944 and the present day about performance with the construction industry. Context is achieved by placing the research within public sector procurement and boundaries attained through a case study and reflected by professional practice.
2. A problem statement constructed from concerns of government clients with performance and attempts made by professional practice to address them. The problem statement includes differing views of framework agreements as a method of improving performance with reference to professional reports and construction industry issues at the time of research.
3. Six hypotheses from three groups have been formulated using an aggregation of diverse but interrelated theories. These align with construction management theories for identification and measurement of performance used to provide a basis for obtaining empirical data.

4. Testing of each hypothesis is achieved through empirical means using statistical techniques to provide conclusions.

4.6 Research method paradigms

A predominant research method used by construction management researchers is quantitative (Dainty, 2007), supporting a dominance set within a positivist paradigm. This approach is often selected because empirical information provides compelling evidence in order to explain phenomena and provides answers to measure extent (how much) and quantum (how many). Analytical manipulation of quantitative data allows recognition of variables through a scientific process (Walker, 1997). Results are subjected to statistical comparison of samples undertaken, with a purpose being to measure these against standardised populations allowing explanatory statements to be made (Czaja and Blair, 1996).

A predominant quantitative research paradigm places emphasis upon facts and effect of behaviour (Bogdan and Biklen, 1998) where results are summarised through established mathematical processes and expressed using statistical terminologies (Charles, 1995). In support of quantitative methods, qualitative methods are used in this research to discover views of practitioners – an important feature of professional doctorate research.

4.7 Framework of research methods for this research

A rationale of methods placed in context to this research is explored in detail, supported with reference to published studies where appropriate. An overarching method applied is through the primary use of a single case study to the whole thesis, with a deeper discussion of this method undertaken at the next chapter. Other methods secondary to this principal paradigm and are used to support the conceptual model and test proposed hypotheses.

4.7.1 Case study approach

Case studies provide data of highest quality and depth (Wineburg, 1997), but when applied to construction project life cycles require a long period of time to amass

collection of data, determine views and provide conclusions. Nonetheless, the value of case studies is recognised by a graphical representation of the breath versus depth choice shown at Figure 4.1

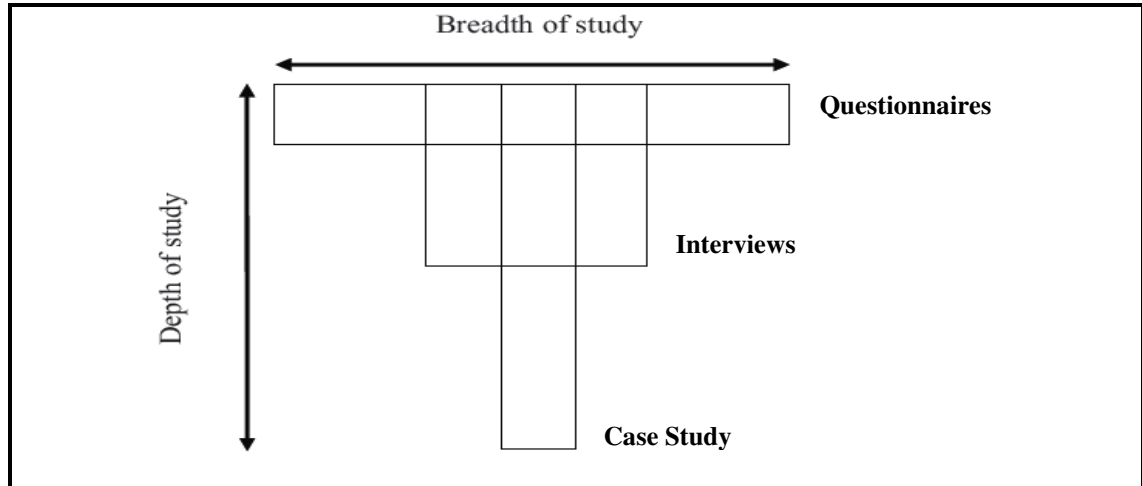


Figure 4.1: Breath versus depth choices of survey methods (adapted from Wineburg, 1997).

This research employs all three methods of survey but with significant reliance on data from a single case study. The depth of available data from the case study is considerable and proportional to indications in Figure 4.1. Quantitative data from projects contained in the case study are supplemented by qualitative views of participants. With this regard, the case study also has significant breath as well as depth. Collection of the data employs specific collection approaches and these are now considered. The case study context is discussed further in chapter 5

4.7.2 'Desk research' approach – quantitative method

Desk research defined by Fellows and Liu (2008, p98) involves collecting documentary evidence data produced by others in order to provide data for analysis and observation. Advantages with use of this method are that ready made sources of data can be collated relatively quickly through access of records and documents. With many research projects where a micro-system is being investigated, desk research is the only way of obtaining viable data. Use of desk research does however require critical review. Raw data may not share the same context with those of the study and definitions used align.

This research uses a significant amount of data obtained using the desk research approach due to investigation of phenomena between two batches of construction projects – those procured using traditional discrete methods verses those engaged through a framework agreement with performance mechanisms. Consistent sampling processes have been applied because outcomes align with contractual agreements referenced through standard procedures (such as start and finish notices). Supporting data is obtained through the organisations' controls which are linked to statutory functions – for example, a legal requirement to comply with highways regulations and a licence to operate on public highways.

Comparison of 'like for like' data over a long period of time (four years) is assisted by reference to the organisations controls – which for contractual arrangements and statutory functions have not changed over the period being studied. All projects included within this research are subject to Public Contracts Regulations (2006) and statutory audits regulated by the Audit Commission.

4.7.3 Survey approach – questionnaires and interviews

Use of survey research is a popular method to detect sociological culture because it acknowledges developed principles, theories and accepted research to identify data sources for a discrete research study (Czaja and Blair, 1996). The use of questionnaires and structured interviews to gather data for a sample group enables statistical analysis to be undertaken and transposition toward a population (Creswell, 2003). Although surveys have limitations – such as a low response rates from questionnaires, the methods used allow a range of issues to be discovered through interaction of the process.

Within the paradigm of construction management the role of questionnaire and interview account for a significant method of data collection. Questionnaires allow a wide breath of study to be covered but at a shallow depth. Interviews following questionnaires allow probing of issues at greater depth - but resources required to collect and analyse data is substantial. Nonetheless, as proposed by Cresswell (2003), trends, attitudes and opinions generated through a sample of that population is a valid method. Sociological/psychological studies also support use of such methods where a technical class (i.e. a close technical group of people such a linked professionals) is being observed.

4.7.4 Interaction of qualitative and quantitative methods in this research

Qualitative methods employ an interpretive paradigm that seeks to understand '*real world settings where the researcher does not attempt to manipulate the phenomenon of interest*' (Patton, 2002, p39). As opposed to quantitative research, which uses prediction, casual determination and findings, qualitative research applies understanding, illumination, and comparative extrapolation (Hoepfl, 1997). Qualitative methods seek to provide answers to the 'how and why' questions by developing themes from identified data (Cresswell, 2003). This themed approach suits research into organisational culture because it combines sociological anthropology with organisational perspective. Qualitative analysis gathers results from a different area of knowledge than quantitative because the former seeks to understand the underlying philosophical nature of each paradigm whereas the latter concentrates on compatibility of research methods by '*enjoying the rewards of both numbers and words*' (Glesne and Peshkin, 1992, p8). Methods used in qualitative research such as interviews and observations are dominant in the naturalist (interpretive) paradigm and supplement the positivist paradigm whereas survey methods create an opposed order.

An ability to examine insight into organisational culture within the construction process will assist with identifying 'from the inside' areas considered important by practitioners (Rooke and Seymour, 2002). Interviews and questionnaires allow integration with participants and also provide an appropriate method of collecting qualitative data to assist with identification of cultural paradigms. Questionnaires are predominantly quantitative in essence but an element of the questionnaire involved collection of views from framework agreement participants. Recognition of qualitative values allows construction of an interview schedule to explore views further.

Interviews sought to discover essences of practitioner views by questioning the connection between performance and framework agreements and **if** or **why** there is any difference between performance of framework agreements with discrete projects. Results from interviews form the largest portion of qualitative data, but has the benefit of generalisation through interpretive validity where an understanding of the

perspective of the group under study are identified through the questionnaires and qualitative statements made by the organisations corporate and operational strategies. Although an apparent relationship exists between qualitative and quantitative paradigms – projects that achieve success in terms of quality, time or cost (quantitative) are recognised by participants involved with them (qualitative) (Walker, 2011), – triangulation within this research is applied to the qualitative paradigm by engagement of the literature review, questionnaire survey and interview. This follows a complementation proposition of two paradigms suggested Mintzberg (1979) where scientific enquiry of outcomes (hard data) is supported through relationships/views (soft data).

4.8 Summation of the methodology of this research

Radford and Goldstein (2002) concluded that contextual positioning selected for research had to reflect available information and data in order to provide systematic and reliable evidence. For this research, the following contexts are used:

- a thorough and critical review of published research into problems with performance of construction projects from the perspective of public sector clients.
- focus and identification upon an appropriate research question or problem arising from the critical review.
- review current professional tacit knowledge about the subject of performance and economics relevant to framework agreements. This is particularly appropriate to Professional Doctorate research, which is practice based and industry relevant.
- collation of published research, theories and practice into a conceptual model allowing construction of six appropriate hypotheses.
- testing each hypothesis using ‘real world information’ by collecting project data, views and documents supported by reference to reliable systems from trusted evidenced sources.
- presentation of results and conclusions using initial statistical results followed by recognised statistical tests to reduce errors or chance.

Within construction management research, methods that relate to sociological interaction and process investigation are appropriate rather than use of laboratory based scientific experiments (Dainty, 2007). Methods adopted for this research are summarised in Table 4.2 together with a comment about the analytical techniques.

This research is set within a paradigm of a single case study in order to explore data and information relevant for a public sector organisation. The organisation is of sufficient economic mass (> £1Bn annual turnover) and also has a continuous requirement for construction industry products in delivery of its statutory duties. The organisation also directly employs more than 100 qualified staff, such as engineers and quantity surveyors, with the management of projects allowing access to views from practitioners allied to the construction professions.

Within the case study, the following methods are used:

- A quantitative study will be conducted based on documents research by subjecting performance outcome results to t-tests in order to detect differences between all 164 framework and traditional discrete civil engineering projects executed by the organisation between 2006 and 2010. The results will be used to test Hypotheses 1 to 5.
- A qualitative questionnaire survey will be conducted with 100 practitioners (out of an estimated population of 180) from participants to the research - Hampshire County Council and framework contractors to reaffirm project outcomes between the two procurement methods engaging with practitioners' views. This triangulates the quantitative study to test Hypotheses 1 and 2.
- Qualitative data is also collected through a questionnaire survey with the 100 practitioners and interview with 10 of these practitioners to establish the performance drivers. A questionnaire survey was used to identify the sociological behaviour factors and operational performance measures, which were then validated by the professional views and opinions from the prominent and experienced practitioners through the interviews. Factor analysis was used to reduce the sociological behaviour factors to facilitate the interview process. The results were used to test Hypothesis 6.

Table 4.2: Methods used in this research following consideration of McNamara (1999) and Fellows and Liu (2008)

Method	Rationale	Comment upon analytical techniques
Case Study	Allows in-depth research and collation of considerable data	A holistic approach can be undertaken to align projects and participants including an overarching view of critical success factors. Collation of quantitative data with qualitative data allows a form of triangulation to be undertaken enhancing conclusions
Quantitative study – documents search	Collection of data from an evidential standard in accordance with conventional norms	Examination of legal documentation (such as contractual administration letters – start, finish etc.) for reliable quantitative data for t-test calculation.
Survey approach - Questionnaires	Allows systematic and methodological compilation of group views	Aggregation of qualitative data using quantitative methods (factor analysis) to collate views from participants allied to professional practice.
Survey approach - Interviews	Provides depth of views from selected participants – allows open free speech	Aggregation of qualitative views from participants by node detection to encompass professional practice.

4.9 Method of measurement – quantitative assessment of performance outcomes

Traditional performance outcomes are reflected by reference to financial outcomes (Maskell, 1991) which are outcome orientated or results focussed through monetary resource equivalents (Melnyk, *et al*, 2004). This is considered by Kaplan and Norton (1992) to be too narrow a description of performance and their research proposed a number of metrics that represented desired outcomes of an organisation. This wider view of performance measurement is described by Kagioglou *et al* (2001) as ‘*the process of determining how successful organisations or individuals have been in attaining their objectives and strategies.*’ Achievement of measurement is through the use of metrics and Dimancescu and Dwenger (1996) grouped metrics into three groups:

- Static measures – gathered after an occurrence of events and designated as lagging metrics.
- Motivational measures – designed to encourage a culture for continuous performance.
- Dynamic measures – used to predict probable outcomes and able to identify if corrective actions are needed.

Love and Holt (2000) identified that use of performance management ensures that requirements of customers are met, standards are available for comparison, problems with quality are identified and improvement feedback is available. Takim *et al* (2003) proposed that measures to assess performance could consist of inputs, outputs and final project outcomes which match the organisational objectives.

This research will utilise metrics that match objectives of the organisation by static measure (project outcomes), motivational measure (performance incentive mechanisms) and dynamic measures (recognising deficiencies in standards). Metrics, by definition, follow a quantitative paradigm but views arrived through observation of participants provides qualitative evidence.

4.10 Sample size from case study population

The case study represents all projects undertaken and directly controlled within the Capital Works improvement programme for Highways and Transport of Hampshire County Council between May 2006 and December 2010. It does not relate to projects that are financially supported by the Council and then managed by other organisations. All of the projects have been designed, procured, tendered and managed in accordance with the organisations' standing orders applicable at date of operation. A trawl of the organisations' database has been made to include all projects between the case study dates and this represents the whole case study population. Only directly controlled projects have been included for each case – discrete projects verses those procured within a framework agreement. A direct control serves two purposes within a case study context:

- All projects are subject to the same levels of evidence in support of data. Key data such as start and finish dates, identification of defects, interim payment certificates and the like, are evidenced by reference to contractual

letters and certificates. Examples of evidence are contained within Appendix 8 of this thesis.

- Quality of data can be explored at a greater depth than more usually available. Data for quantitative analysis of project outcomes from an operational life cycle between tender process and completion is available for the study period whilst parallel qualitative views are collected from those involved with project management over the same period.

In summary, this case study gathers information from all infrastructure capital works within the organisation between 2008 and 2010 (100% sample size), questionnaire responses from 100 participants out of an estimated population of 180 (55.6% sample size) and 10 structured in-depth interviews (5.6% sample size). Sample sizes for qualitative studies are discussed further in successive chapters.

4.11 Sources of evidence for this research

This case study starts in May 2006 by looking at the operation of construction projects controlled by the organisation and collecting outturn data from that point. Data on projects is collected from May 2006 until May 2008 which is represented by discrete or traditional projects. The study then follows research starting with the conceptual objectives of the organisation to development of performance controls, contractual mechanisms and mechanisms in delivery of the frameworks. During this formulation period within Hampshire, evidence has uncovered an extensive consultation period of approximately eighteen months involving client representatives, suppliers and managers, invited to identify optimum project outturns and suggest areas of improvement in delivery of construction projects. This cumulates into Executive Member reports included at Appendix 2 which gains political support and complies with the democratic process required of the organisation.

4.12 Reliability of case study evidence

Egan (1998) commented that *'the industry must replace competitive tendering with long term relationships base on clear measurement performance in quality and efficiency ... (by) producing its own structured, objective performance measures agreed with clients.....construction companies must prepare comparative*

performance data and share it with clients and each other without compromising legitimate needs for confidentiality'. Egan's comments arrived from observations that research into construction projects was limited and outcomes between projects difficult to compare. This is due to the large number of variables and varying elements aggregated within each project. Differing clients, design teams, design solutions, project location, financial models, procurement and engagement methods, and supervision controls can affect outcomes and performance perception. Measurement of performance between projects may not be reliable or sufficiently accurate to determine comparable results. Evidence from projects contained within this study is not subject to such wide variances as those from external sources because the same project controls apply to all 164 projects. Design standards, contractual mechanisms, financial controls and project objectives remained constant for the period examined. This allows *'variables to be identified and relationships measured'* (Glesne and Peshkin, 1992, p7). Characteristics of projects are examined in further detail in a later chapter with data analysis of the outcomes to detect tendencies.

4.13 Triangulation of methods

Triangulation is a strategic test for improving validity and reliability of research by combining research methods. Mathison (1988, p13) deduced that triangulation *'has risen an important methodological issue in naturalistic and qualitative approaches to evaluation in order to control bias and establishing valid propositions because traditional scientific techniques are incompatible with this alternate epistemology.'* Patton (2002, p 247) advocated use of triangulation by adding that *'triangulation strengthens a study by combining methods. This can mean using several kinds of mixed methods or data, including both quantitative and qualitative approaches.'* Johnson (1997) recognised that use of investigators, method and data triangulations to record reality is appropriate. This is particularly so when an 'open-ended' approach is developed where participants to a research project assist with the research question in addition to data collection. Barbour (1998, p353) does however warn of potential problems through mixing methods within a single paradigm, because each method carries its own assumptions in *'terms of theoretical frameworks we bring to bear on our research'*. Conversely, mixed method triangulation

according to Jick (1979), is used to enhance internal validity and reliability. Provided that objectivity can be applied to data and information Drenth *et al* (1998, p13) asserts that '*judgement or classification of data in scientific research should not be substantially influenced by the subjectivity of the observer*'.

Applying caution from Barbour and advice from Drenth allows this research to be triangulated through comparison of applicable results of qualitative and quantitative methods. Views from participants set within a sociological class assist with correlation of results and strengthen overall conclusions reached from individual analysis.

4.14 Overview of case study enclosure and research methods

Preceding paragraphs in this chapter outlined methods and approaches for this research, together with the interaction between each element and positioning related to the case study context. The overview is shown diagrammatically at Figure 4.2. Theory and practice is positioned external to the case study enclosure but aligned to each paradigm. Use of qualitative and quantitative research paradigms direct use of specific methods used to support the decisions or relevance to the case study. As each method is concluded, results are compared and contrasted with published literature at a culminated stage enabling conclusions and recommendations to be reached.

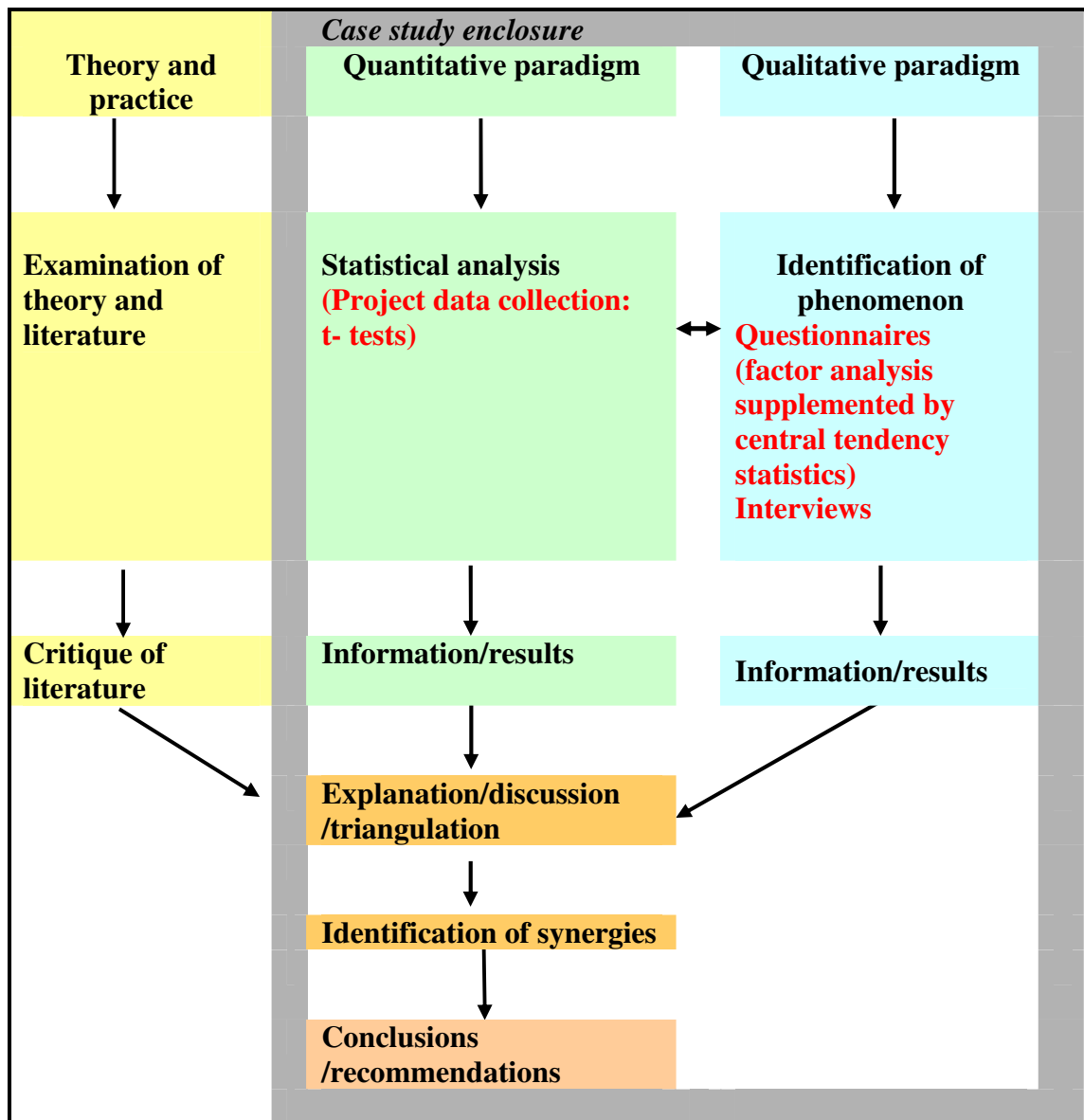


Figure 4.2: Diagrammatic view of case study and research methods

4.15 Overview of quantitative and qualitative analyses

Following construction of six hypotheses and discussion with methods and measurement parameters, recognition of variables, data sources and statistical tests/methods for this research are summarised within Table 4.3.

Table 4.3: Overview of hypothesis, variables, data sources and statistical tests/methods (adapted from Lam, (2002))

Hypotheses and supporting theory	Variables	Anticipated impact of frameworks	Sources of data	Statistical tests/analytical methods
<p>H1: Relationship between performance objectives and out turn critical success factors</p> <p>Based upon performance management and measurement theory.</p>	<p>Five critical success results from key performance indicators of the two groups – timescales (2), payment, defects, health and safety.</p>	<p>Significant improvement arising from framework agreements</p>	<p>Output from raw project data calculated into quotients with weighted proportions assigned of the two groups – discrete and framework projects</p>	<p>Primary - Independent t-test applied to all 164 projects.</p> <p>Secondary – Independent samples t-tests applied to 60 paired projects.</p> <p>SPSS version 20.0.</p>
<p>H2: Relationship between critical success factors and project success index.</p> <p>Based on theories of long term relationships improving project outcomes.</p>	<p>Project success index which is an aggregation of project critical success factors determined by the client organisation – timescales (2), payment, defects, health and safety.</p>	<p>Significant improvement arising from framework agreements</p>	<p>Calculation of key project outcomes from raw data of projects divided into two groups</p>	<p>Primary - Independent t-test applied to all 164 projects.</p> <p>Secondary – Independent samples t-tests applied to 60 paired projects.</p> <p>SPSS version 20.0.</p>
<p>H3: Relationship between</p>	<p>Ratio of production cost compared</p>	<p>Ratio of cost of actual production</p>	<p>Raw data from organisation</p>	<p>Independent t-tests applied to production</p>

production costs between discrete and framework agreements. Based on competition economic theory for traditional tendering methods.	with estimated production cost.	and estimated costs of production for framework agreements is significantly higher due to reduced competition	records for anticipated estimate and actual tender price for each project of the two groups	costs of projects. SPSS version 20.0. Action research for a single test project issued to competitive market.
H4: Engagement transaction costs of framework agreements and traditional tendering methods Based upon economic tendering theory	Fixed and variable engagement costs	There is no significant difference between engagement costs of framework agreements and traditional tendering methods.	Raw data from organisation records for the costs of monitoring applied to projects of the two groups	Independent t-tests applied to transaction costs of projects. SPSS version 20.0.
H5: Relationship of performance monitoring transaction costs between discrete and framework agreements. Based on performance management economic theory.	Fixed and variable performance monitoring costs of each groups	There is no significant difference between performance monitoring costs of framework agreements and traditional tendering methods.	Raw data from organisation records for the costs of monitoring applied to projects.	Independent samples t-tests applied to monitoring costs of projects. SPSS version 20.0.
H6: Relationships between sociological factors	Dependent variables: Performance outcomes; Independent	Performance outcomes are positively associated with the	Sociological group questionnaire survey to both groups	Factor analysis using SPSS 20.0. Measures of central

(behaviour factors) and operational factor (performance measures). Based upon group behaviour theory.	variables: Ten sociological behaviour factors and four performance factors (see Figure 3.7 on P.77)	sociological and operational factors.	Selected interview transcription	tendency. Word frequency analysis using NVivo 9.2
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4.16 Summary

A review of published literature into the subject matter of framework agreements could not uncover any directly comparable research either for the method of procurement or with framework effects upon project outcomes. Instead, elements from a literature review focussed upon interactions with sociological groups, performance measurement in the construction sector and managerial studies to construct a procurement performance management model.

The procurement performance model included in chapter three provides a professional practice basis upon which a methodology is engaged which reflects published research into construction management. Predominant tenets identify that a positivistic and interpretivistic approach is appropriate for this research and philosophical enquiry should follow these paradigms.

Philosophical context allows development of six hypotheses that correlate into three distinct groups – introspective outcomes from quantitative data, extrospective outcomes from quantitative data and performance drivers from qualitative data sources. In order to provide a theoretical control to this research, a ‘four- sequence’ method is proposed to manage each stage of the research process allowing direction to be gauged for determination of research methods.

A framework of suitable research methods is discussed in paragraph 4.7, derived from available data, professional practice and academic procedure. The depth and richness of available data, centred upon a single organisation, makes the use of a case study entirely appropriate. Supported by desk studies and surveys, a consideration of the advantages and disadvantages of each method at Table 4.2 is shown including realisation of the contextual positioning of each.

Providing a link between data and methods requires contemplation of evidential properties and reliability standards. Evidential sources of data indicate a rich vein starting with strategic objectives of the organisation supported by political Member approvals through to controls and implementation of projects with contractual mechanisms. Reliability is examined through a discussion by contrasting the range of variables with projects in this research with those experienced with construction management. The conclusion from this initial examination is that fewer variables are present in the case study projects due to the narrower technical range (all are civil engineering highways related).

A summation of research methods is shown diagrammatically in Figure 4.5 relative to the case study enclosure. Figure 4.5 also provides identification of the triangulation stage where qualitative and quantitative paradigms converge to allow formation of conclusions. Table 4.3 expands the research overview by linking statistical tests and methods with data sources. Within each hypothesis, dependent and independent variables are shown allowing a control and direction to be applied throughout management of this research.

In summary, use of a holistic single case study method fulfils a desire to widen this research in reaction to criticisms from academic authority concerning the '*apparent narrowness of the construction management research community's methodological outlook and the implications for understanding of the practice of construction.*' (Dainty 2008, p10). As the single case study, supported by Yin (2003), is so significant to methods used by this research, the next chapter considers this aspect in greater detail.

CHAPTER 5: THE CASE STUDY CONTEXT

5.1 Use of a case study method for this research

The research methodology explored in Chapter four included a number of methods to access, control and manipulate data in order to explore relationships between organisational groups and performance outcomes for individual projects and those contained within framework agreements. All data sources are set within a single but holistic case study. Although the nucleus of this case study is centred upon a single organisation and collects data and information from an employer/client perspective, the whole study adopts a holistic approach which encompasses engagement outside the organisation through different suppliers and external groups. At the core is a single public sector local authority for whom delivery of construction projects forms improvements to highways as part of its statutory obligations, with multiple private sector suppliers (often known as contractors) engaged to manage and construct individual schemes. The holistic case study approach allows a partial immersion into relationships between groups and individuals in the construction management and delivery process at a far greater depth than by individual collection of specific data through questionnaires, interviews or project outcomes. In addition, data sources can be merged to provide an engagement of views from different groups such as engineering and surveying professionals allowing perspective and context to be captured. Use of a single case study for holistic immersion combined with critical appraisal methods is an established technique for disciplines where evidence based practice is prevalent (Crombie, 1996). This is particularly relevant for examination of construction management and professional practice, where interaction frequently occurs between organisational groups such as supervisors and suppliers.

5.2 Difficulties and restrictions with use of a case study method

The scientific community has differing views concerning use of case study methods. Campbell (1966) argued that scientific research should be based upon quantitative methodologies only, where examination of phenomenon is supported through empirical datasets and therefore case studies did not fulfill strict analytical procedures. Campbell did however modify his views at a later date (Campbell, 1975)

and became a strong advocate of the case study method for use where observation of social interaction between individuals or groups is required.

Although not discounting use of case studies as a form of research method, Abercrombie *et al* (1994, p34) warned that any conclusions arrived from a single case study *'cannot provide reliable information about a broader class'*. Abercrombie's statement has some validity where results from a single case study are extrapolated into larger experimental groups, but does not take in consideration the depth of data available when using a case study approach. Sociological and anthropological studies rely upon single case studies to elicit behaviour and this is an accepted method for analysis (Ragin and Becker, 1992). Careful triangulation of data from differing areas of a single case study may be constructed into a matrix that provides a cohesive analysis of results to strengthen information. Provided a single case study has sufficient mass, then a comparison with a broader class is certainly available (Yin, 2009). Bent Flyvberg (2011) went further by stating:

'One can often generalize on the basis of a single case, and the case study may be central to scientific development via generalization as supplement or alternative methods. But formal generalization is overvalued as a source of scientific development, whereas 'the force of example' and transferability are underestimated'. Flyvberg argued that a large number of samples can hide information rather than expose it, and cited Karl Poppers 'White Swans' as an example. Following examination of a number of similar case study examples, especially with the detailed study of deviant cases, George and Bennett (2005) demonstrated strong links between single case studies and theory development. Walton (1992, p. 129) found similar evidence and concluded that *'case studies are likely to produce the best theory.'*

Another perceived difficulty with case studies is the possibility of researcher bias through an observational process or when dealing with introduction of extraneous variables (Fellows and Liu, 2008). Observational bias occurs where a researcher interprets actions using assumptions without investigating motives leading to the actions. Extraneous variables are those specific to an individual project or organisation that are particular to that case. Such variables may skew results leading toward inaccurate conclusions that do not represent the topic under study. Diamond, (1996, p.6) viewed that case studies suffered from lack of scientific methods which assisted with *'curbing one's tendencies to stamp one's preexisting interpretation on*

data as they accumulate'. In contrast, George and Bennett (2005, p.20) suggested that use of quantitative methods in isolation does not allow researchers to get as close to phenomena as those adopting case study methods. Their reasoning is that a structural researcher is less likely to be corrected by data 'talking back' - something that happens frequently with a case study interview. In conclusion, and following a detailed analysis of a number of single case studies Flyvberg (2011) stated:

'The case study contains no greater bias towards verification of the researcher's preconceived notions than other methods of inquiry. On the contrary, experience indicates that the case study contains a greater bias toward falsification of preconceived notions than toward verification.'

With difficulties recognised in mind, this research will concentrate upon impartial data collection techniques (relying upon contractual letters and performance indicators), controlled data sets (defined measures within rigid tolerances) and comparison information (cross referenced data sets between projects) within the case study to construct a matrix of information to minimise bias and errors. Qualitative information gathered through interview process will be examined for corrections identified by George and Bennett (2005).

5.3 Advantages in use of a case study method

Case studies are very efficient at recording qualitative as well as quantitative data. As Mintzberg (1979) noted *'we uncover all kinds of relationships in our hard data, but it is only through the use of this soft data that we are able to explain them'*. A significant element of construction related research relates toward examination of interaction between individuals, groups and organisations. According to Fellows and Liu (2008) case studies allow topics to be structured against set procedures where phenomenological actions can be placed within a context. For research where professional practice is placed at the centre of construction management, contextual positioning within a case study allows in-depth analysis to be undertaken. This research uses contextual positioning from a sociological class of professionals - engineers, surveyors, project managers – through responses to interviews. Phenomenological studies undertaken by Bourdieu (1977) recognised the importance with collection of rule based analytical activity and fluid use of tacit skills – reflecting the skills frequently used by practitioners. Flyvberg (2001) further noted

that intimate use of thousands of examples of tacit skills was common to all experts. Conclusions reached by Flyvberg (*Ibid*) confirmed that investigation of a small sociological class, such as construction professionals, could provide information that is scalable to the population of that class as a whole. This conclusion arose through a structured learning and training process achieved by experts from gathering context knowledge and experience. This research collates qualitative data, including professional judgment, from a number of construction professionals and aims to capture the ‘soft’ element described by Mintzberg (1979) as a vital component of the study.

5.4 Structural components of the case study method used with this research

The use of a case study approach for use within this research has significant advantages with analysis of ‘in-depth’ data collection for both qualitative and quantitative methods due to availability of data and the capture of views not normally accessible through distanced collection methods. Views of participants are correlated with project outturn data from differing sources but within the ‘framework agreement community’. Risk with introduction of bias from the researcher described by Klein and Myers (1999) ‘*requires sensitivity to possible biases and systematic distortions in the narratives collected from the participants.*’ In order to control use of the case study method to minimise these concerns, a structured approach is shown in Table 5.1.

Table 5.1: Structural components examined for management of the case study with this research

Structural element	Awareness of concerns with validity and reliability	Evidential literature supporting application of method
Philosophical stance of researcher	Researcher immersed in framework delivery and therefore aware of results. Bias counteracted by raw data collection from contemporary legal records of the organisation (contractual documents, letters, records). Analysis undertaken using data manipulation for similar construction related research. Contrast and comparison of quantitative and qualitative results.	Klein and Myers (1999) Walsham (1995)
Data collection	Detailed descriptions of the data sources, examples of actual documents contained in the appendices. Definition of data according to engineering and construction national/international standards and measures. Transcription of interviews and questionnaires.	Greenhalgh (1997) Miles and Hubermann (1994)
Contextual positioning	Cross reference/compare and contrast this research data and conclusions with professional practice. Integrate with managerial systems within the organisation.	Carroll and Swatman (2000)
Findings and conclusions	Apply recognised statistical methods to determine validity and reliability. Extrapolate results to contrast and compare with whole populations – relevant to engineering public sector statistics from other research.	Yin (2003)

5.5 Case study method relevance towards professional practice

Proverbs and Gameson (2008) noted that '*application of the (case study) approach within the construction management research community is seemingly at a relatively low level*' despite opportunities to uncover qualitative data and engage with professional practice. Explanations given for the low level use of case study methods for construction management (*Ibid*) are difficulties finding suitable organisations to engage with where free rein is given, or availability of significant volumes of data or depth of immersion allowing statistical significance. In recognition of these difficulties, the case study for this research displays the following attributes:

- The organisation and participants chosen for this research have allowed unrestricted access to confidential data such as contract sums, tendering processes, performance marking criteria, results and historical records.
- The organisation and participants are of mass and size to allow collection of data from a variety of projects for comparison.
- Control systems used by the organisation are available for replication due to the engagement methods being subject to statutory regulations and transparent governance.
- The organisation and participants employ in excess of 100 construction professionals (engineers, quantity surveyors, designers) ensuring that data is measured to construction standards within a professional environment.

Remenyi *et al* (2002) recognised seven characteristics of successful single case study related towards general academic studies which have been adapted for the construction environment and professional practice used with this research. These are:

5.5.1 Provision of a story that is relevant for construction and engineering professions.

Framework agreements are a relatively new concept for public sector procurement and a current topic included in construction media. The story starts with concerns from clients which develop into a possible solution for improvement (framework agreements). The case study investigates operation and results of an agreement

together with reasons why performance outcomes are different. The story concludes with results and application to future professional practice.

5.5.2 Multiple sources of evidence for professional practice.

Two sources of evidence for professional practice are collation of data from quantitative data of project outcomes together with qualitative data using professional opinion and feedback.

5.5.3 Correlation of discrete data streams with professional trends.

Triangulation of the multiple sources of data is used as evidence to correlate views and a contrast made with current professional trends. Engagement with a number of construction professionals through the case study will elicit tacit knowledge and experience to allow presentation of results.

5.5.4 Use of conventions and industry accepted standards.

Measures, standards and conventions used within this research will be to civil engineering practice levels representing professional norms for the projects under consideration. All projects investigated are managed using standard civil engineering conditions of contract thereby ensuring key data is contractually applied to consistent standards. All projects are specified to the same national highways specification and all bills of quantities compiled using the Method of Measurement for Highways Works. Use of a standard specification means that 'resource mix' between projects (operatives, equipment and materials) is comparable, whilst standard bills of quantities between projects ensure similar economic characteristics. A consistency of contractual, specification and economic parameters between projects contained within the case study is used to reduce uncontrolled variables.

5.5.5 Depth of understanding through the case study.

An in-depth understanding of the case study has been recorded through an 'immersion' perspective using reactions and observations of participants. Strong links of professional practice is explored through construction management research and professional bodies.

5.5.6 Alignment of this case study with other public sector organisations.

Although a single case study for a single organisation – Hampshire County Council – UK statutory constitution and legal existence applies to all similar public bodies through the Local Government Act 2003. The same accountability and transparency rules will apply to all public organisations formed under this Act, allowing transferable assumptions to apply regarding financial regulations. Furthermore, all public organisations have to comply with the Public Contracts Regulations 2006, European Union Procurement Regulations and Remedies Directive (2007/66/EC). This allows contextual placement that may be transferable to other public sector authorities.

5.5.7 Boundaries of the single case study.

Temporal limits are reflected through a four year project study period between 2006 and 2010 with data collection overlapping a transition from discrete to framework agreement procurement and engagement methods. Professional interest is contained through integration and concentration of practice directed toward construction procurement and project management topics. Professional practice areas align with those specifically linked to the hypotheses focus debate upon effectiveness of frameworks agreements in economic and performance measures. Together with the definitions contained in Chapter one of this research, these provide boundaries to the extent of this case study.

5.6 Contextual background of case study organisation

This research and case study is set within a service based public sector local authority organisation. Hampshire is the third largest county in England in terms of population and fifth largest for revenue and expenditure (ONS, 2008). The County is located along the south coast of England with a diverse geographical landscape and a mix of rural and urban areas. Hampshire County Council provides a diverse and wide range of local services to people in the areas of education, waste recycling/disposal, social services and transportation. A principle responsibility is the role of highways authority and in execution of these duties a programme of repair, improvement and maintenance of infrastructure within Hampshire forms a continual need for

construction services from the private sector. Delivery of the highways construction improvement programme was delivered, in line with other local authorities, through standard discrete traditional public sector procurement procedures up until April 2008. In May 2008, the discrete method was replaced by two four year framework agreements – Improvement Works Framework 1 (IWF1) for individual projects up to £500,000 in value and Improvement Works Framework 2 (IWF2) for individual projects up to £3,497,000 in value. Both frameworks use the same standard specification and measurement rules.

In line with all publically funded organisations, the Council has to conform to a constitution under Local Government Act 2003 and apply transparency and rigour to the award of projects under the Public Contracts Act 2006. Information regarding policies, procedures and expenditure can be requested by interested parties through the Freedom of Information Act 1984 in order to confirm the Council is complying with appropriate standing orders. Procurement of construction projects and selection of suppliers are governed by the Council's standing orders at first instance and then by public procurement regulations, provided value thresholds exceed the Official Journal of the European Union. These standards are very prescriptive and failure by the Council to comply may result in a legal challenge from a supplier with appropriate award of damages or the setting aside of a contract.

In provision with delivery of services, Hampshire County Council was awarded 'four stars' by the Audit Commission (2009) which represents the highest award available for a local authority. The Commission stated that the award was given after demonstration of strong management procedures and efficient use of resources. Placing this within an economic context, the gross budget for the Council in 2009/10 was £1.7 billion (HCC, 2009) with expenditure for construction activities accounting for around £170 million as demonstrated in Table 5.2.

Table 5.2: Expenditure on construction activities for 2009/10

Section	Capital Programme	Revenue Programme
Property, Business and Regulatory	£21,288,000	£65,378,000
Environment	£41,797,000	£41,108,000
Total	£63,085,000	£106,486,000

5.7 Managerial attributes of the case study organisation

In order to assist with gathering reliable data sets using a case study method, the organisational background should also be certain and reliable (Gerring, 2006, Yin, 2003). In 2006, at commencement of the projects included within this research, Hampshire County Council introduced a corporate performance management framework to strengthen existing managerial policies and provide a streamline approach to manage budgets and resources. All managerial, budgetary and financial information collated from the organisation throughout the research period has complied with this corporate policy and recognition of the strengths with this approach was made by the Audit Commission in awarding a four star rating. The corporate performance management framework is shown in Figure 5.1. Figure 5.1 illustrates indicated senior manager controls and a process map of the organisation.

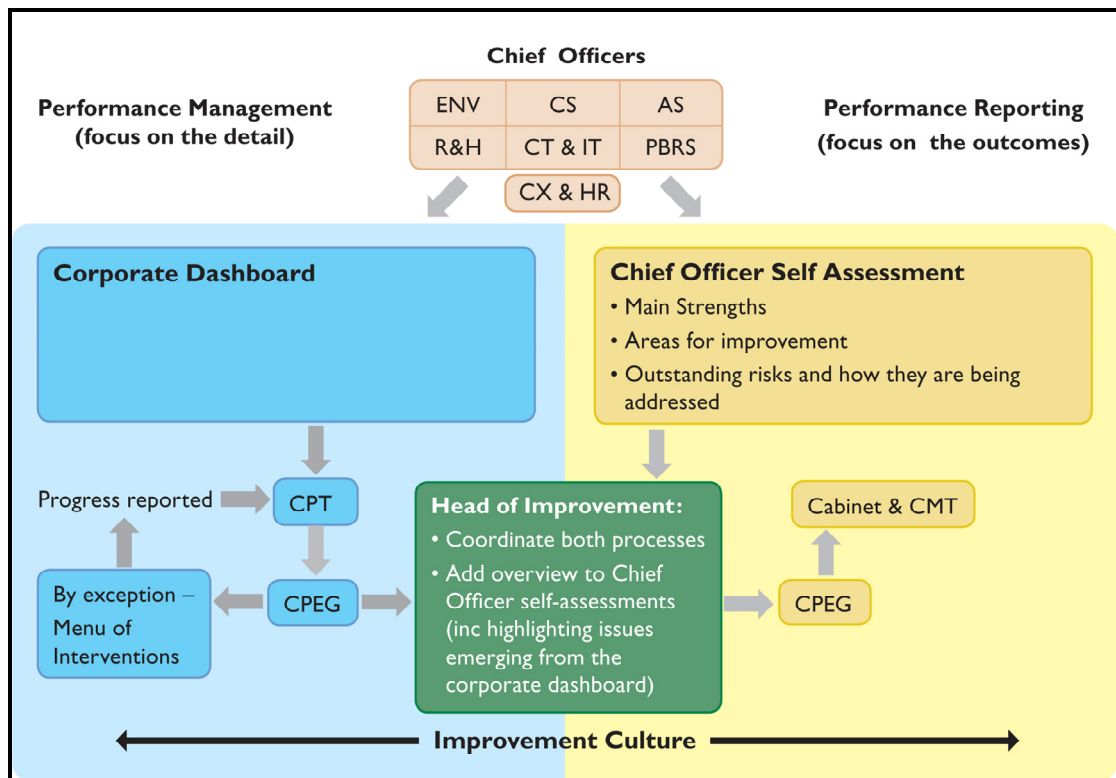


Figure 5.1: Corporate performance management framework showing roles and responsibilities of senior managers for cultural improvement.

Introduction of the corporate management framework in 2006 provides a consistent management structure for all projects contained within this research - prior to and since introduction of the framework agreements. Management and financial controls applied to all construction projects and data gathered from the organisation during the research period (2006 to 2010) have been contained by the corporate management framework.

5.8 Connections between public and private sector organisations relevant to the construction process included within the case study

The client organisation is a key component of the case study but really only represents part of the case study story. Engagement and relationships with suppliers are, according to the literature review undertaken, critical to performance outcomes. The interface between public and private sector is established during the procurement process where rules of engagement are applied.


```

graph LR
    CO((Client organisation)) --- FC[Framework control mechanisms]
    CO --- FA[Framework Agreements]
    CO --- FN2[Framework number two]
    CO --- DP[Discrete projects]
    
    FC --- PCM[Project control mechanisms]
    FC --- KPI[Key performance indicators]
    
    FA --- CS1[Commercial supplier]
    FA --- FN1[Framework number one]
    
    FN2 --- CS2[Commercial supplier]
    FN2 --- FN2L[Framework number two]
    
    DP --- PCM[Project control mechanisms]
    DP --- CS3[Commercial supplier]
    DP --- CS4[Commercial supplier]
    DP --- CS5[Commercial supplier]
    DP --- CS6[Commercial supplier]
    DP --- CS7[Commercial supplier]
    DP --- CS8[Commercial supplier]
    DP --- CS9[Commercial supplier]
    DP --- CS10[Commercial supplier]
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    DP --- CS18[Commercial supplier]
    DP --- CS19[Commercial supplier]
    DP --- CS20[Commercial supplier]
  
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With discrete projects, control mechanisms are applied on an individual basis following a tender process between suppliers and the client organisation. Once selected by the organisation, there are no relationship links between suppliers. 17 separate suppliers were engaged in discrete projects between 2006 and 2008.

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strong relationships between suppliers and the client organisation. Arranged into two groups with two overlapping suppliers, 9 companies were engaged through the frameworks.

5.9 Engagement and mix of professions through framework agreements contained within the case study

Following an examination of relationships between the organisation and suppliers, a detailed study of the mix of professions contained within the framework forum meetings was discovered. Framework forum is the label attached to regular quarterly meetings held between representatives of the organisation and its suppliers. The remit of the meetings are to discuss managerial issues regarding operation of the framework with regard to health and safety, project performance outcomes, public perception, areas for improvement and the like. A record of four framework meetings (Quarters 1, 2, 3 and 4 of 2009) listed the following attendees from six suppliers and the client organisation:

- Seven civil engineers
- Four contracts managers
- Three quantity surveyors
- Two client managers

Relationships between participants and groups are shown in Figure 5.3.

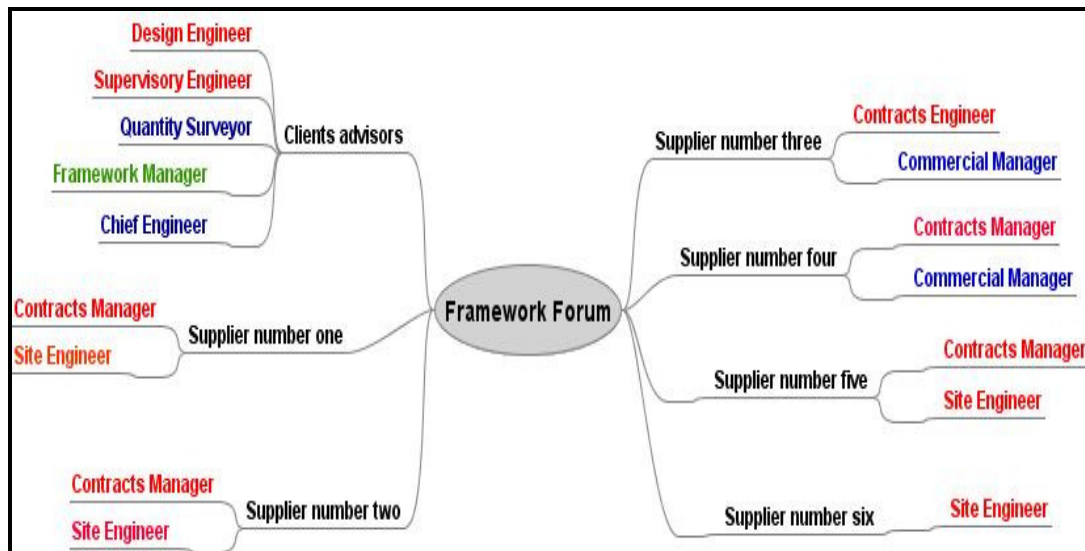


Figure 5.3: Mix of attendees and professions within framework forum meetings in 2009.

Importance of these relationships is reinforced through the strength of professional involvement within managerial controls and participation of the frameworks. Although construction projects are seen by a public sector organisation as part of a service (namely the improvement, maintenance and operation of infrastructure), projects are delivered and controlled by employed engineering and construction professionals following traditional engineering conventions. In a similar way, supply participants, although aware of commercial private sector pressures, tend to focus upon engineering solutions allied to their profession. The cultural context of all participants, whether from private or public sector backgrounds, places professional construction environment at a fore and this provides qualitative information towards this research.

5.10 Techniques used in the case study method

In order to provide a consistent approach to development of tools for the research, a Functional Analysis Systems Technique (FAST) diagram suggested by Miles (1972) has been used. The purpose of this technique is to provide a functional application to interview schedules in order to focus upon questions posed from the six hypotheses identified previously. Draft questions used for interviews in this research were tested using the FAST diagram for functionality. If, for example, a draft question was not relevant to views upon a framework agreement, discrete project, a participant or

professional view, it was not considered functional and therefore discarded or redrafted to align with hypothesis statements. The underlying technique teases, through analytical deconstruction, reasons ‘how’ and ‘why’ a question is included within the research. A final version of the interview schedule was developed and used following application of the FAST technique. The FAST diagram developed for this research is shown in Figure 5.4.

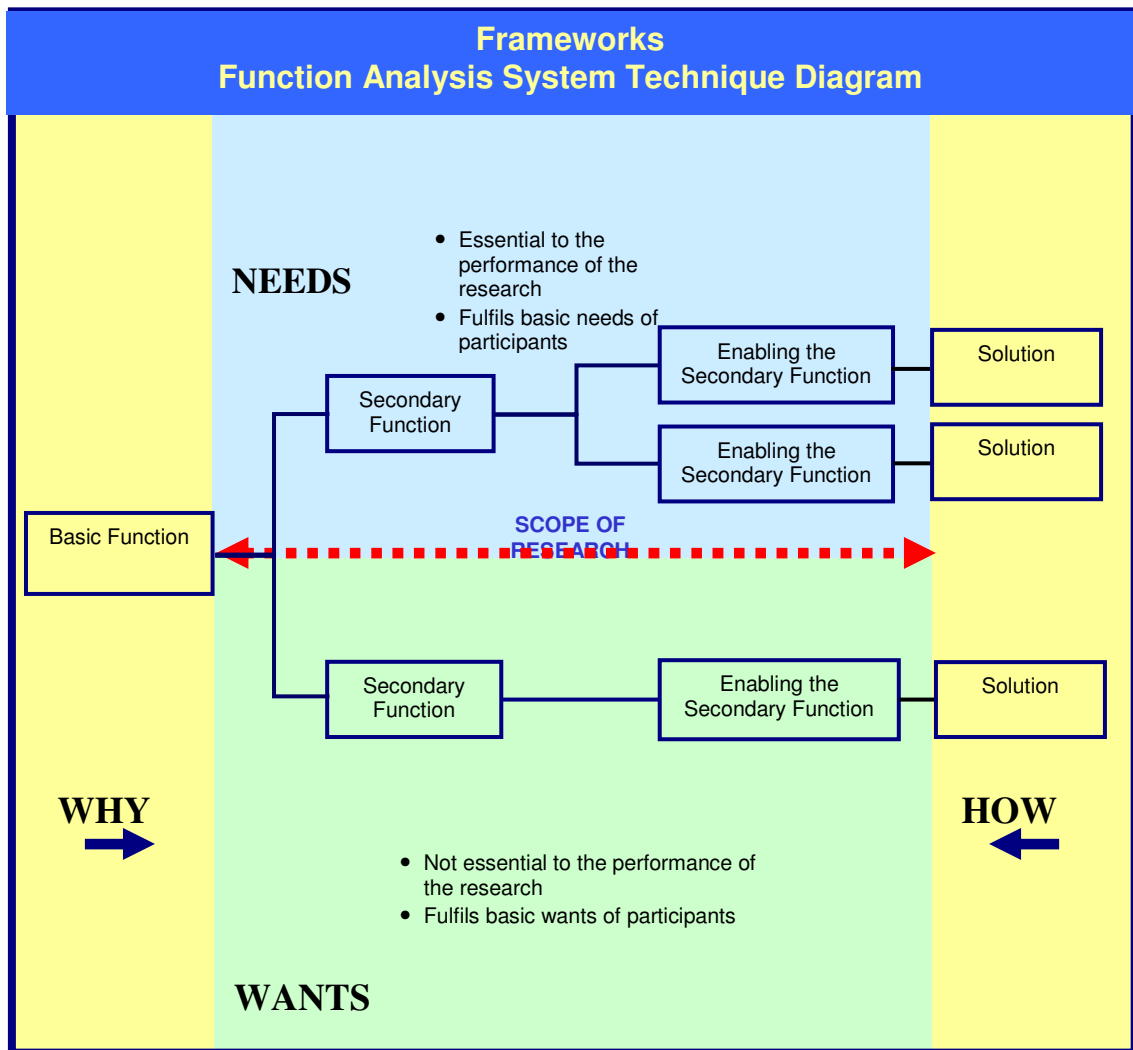


Figure 5.4: FAST technique used for development of qualitative research

5.11 Overall timeline of case study research

Collection of data and information contained within this research covers the period May 2006 until December 2010. Within this period, introduction of framework agreements with suppliers occurred in May 2008. The data collection period therefore transcends both discrete and framework projects initiated by the

organisation. In order to gather data which is suitable to test the hypotheses identified, comparison and contrast is made between these two datasets. These two distinct periods are identified as 'pre-framework project data' and 'framework project data' in Figure 5.5. In addition, an examination is made, pre-framework, of objectives and performance controls of the organisation.

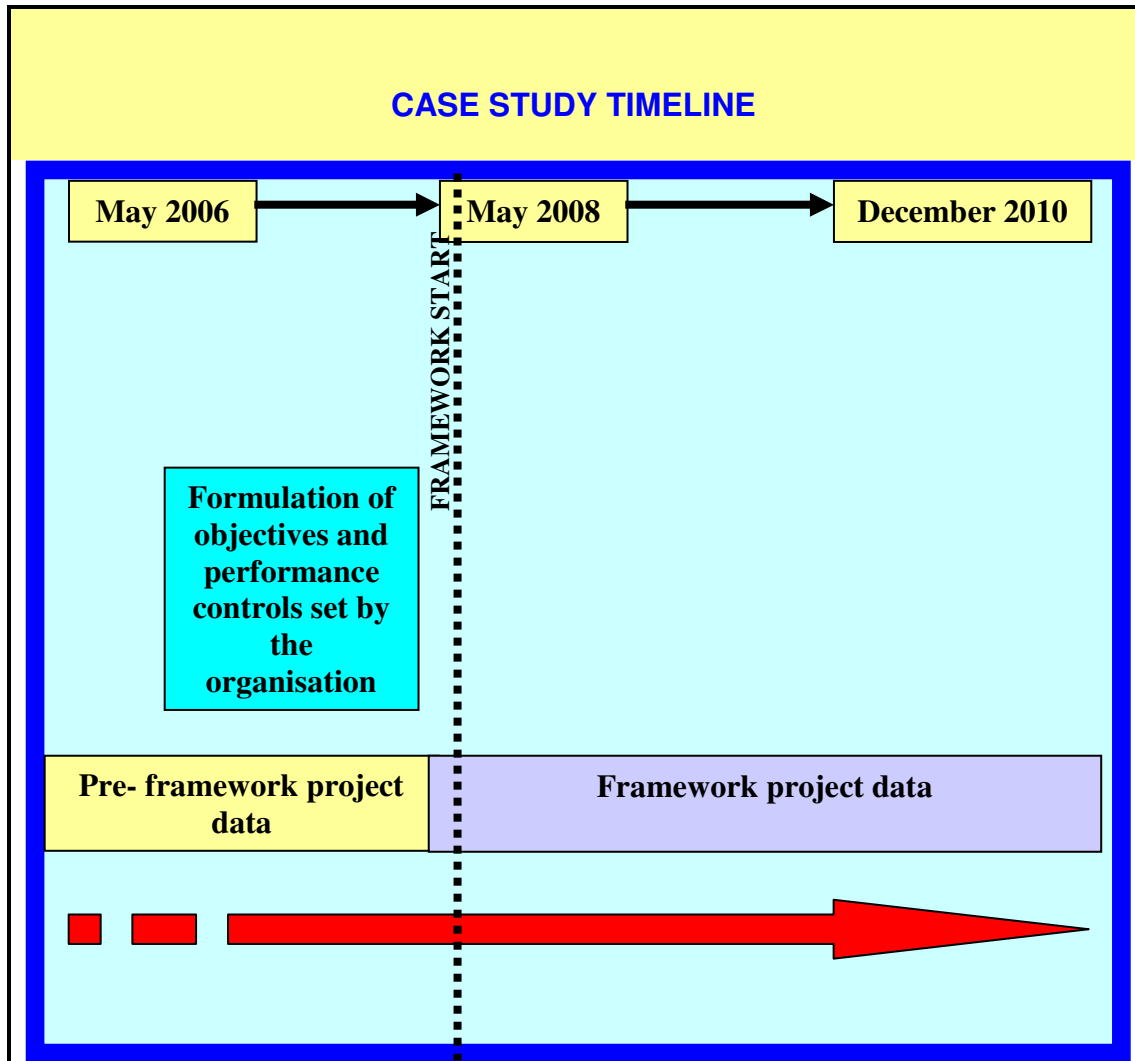


Figure 5.5: Time line of case study 2006 to 2010

5.12 Summary

Use of a single case study method for this research is proposed following an examination of practiced based appraisals where interaction between organisational groups is relevant. Awareness of researcher bias is a warning offered by some researchers and this study aims to minimise this by use of impartial data collection techniques. Although it is recognised that a single case study has limited application, this is compensated by the quality of data captured in order to gain explanation of relationships between variables. Recent literature supports the use of single case studies, especially where sociological phenomena is being discovered.

Relevance of the research with professional practice by a contextual placement of the case study with one large local authority (Hampshire County Council) is supported by the alignment of organisational management controls with public procurement with credence through an independent central government audit (Audit Commission, 2009). Connections between the public authority and private sector supply organisations are constructed from observations made and a comparison with different relationships used for discrete and framework agreement projects. This examination is shown graphically at Figure 5.2. Interactions between participants to the framework forum are shown at Figure 5.3 showing alignment of professional disciplines.

Use of a FAST technique as enquiry to the functional management of the research process provides a critical analysis 'questioning' method. The production of a case study timeline indicates key dates of the research at Figure 5.5 and clearly separates pre and post framework periods.

The above parameters provide boundaries to this research in terms of placement, timescale, extent and methods. Alignment with a significant body of published research material provides confidence with use of a single case study paradigm allowing an examination of the source data to be undertaken.

CHAPTER 6: DATA SOURCES AND THE DEFINITIONS, CONTEXTUAL POSITIONING AND PREPARATION OF DATA USED IN THIS RESEARCH

6.1 Introduction

Research into construction framework agreements is set around a case study within a large UK local government organisation. The overall size (circa 34,000 employees with £1.7Bn annual turnover) and maturity (origins over 500 years ago but more recently formed under the Local Government Act 1972) had allowed access to transparent control systems with which to provide extensive and reliable data sources. A significant amount of data was discovered regarding outcome information of projects and unrestricted access was offered to interface with participants involved in the management of projects. An opportunity was taken to engage with significant technical expertise of the organisation through officers who hold formal qualifications recognised by the industry. Links with members of professional institutions such as Institution of Civil Engineers and Royal Institution of Chartered Surveyors provide a strong link with current professional practice. Contextual positioning with the case study incorporates public sector procurement engagement legislation. This therefore provides a standard of regulation applicable to all UK public sector organisations that share a similar statutory constitution.

Bisection of the case study period during introduction of framework agreements allows a ‘before and after’ analysis of results to determine changes in outcomes. This chapter examines sources of data available for this research and categorises such data into specific types. Each data type is set against a datum identified in Figure 6.1.

6.2 Overview and timescale of source data

The data collection period for this research extends over a period of five years including a period of transition between final operation of discreet contracts and introduction of framework agreements, a period of data collection during operation of the frameworks, and a questionnaire and interview period. Sources of each data stream relative to calendar dates are shown in Figure 6.1.

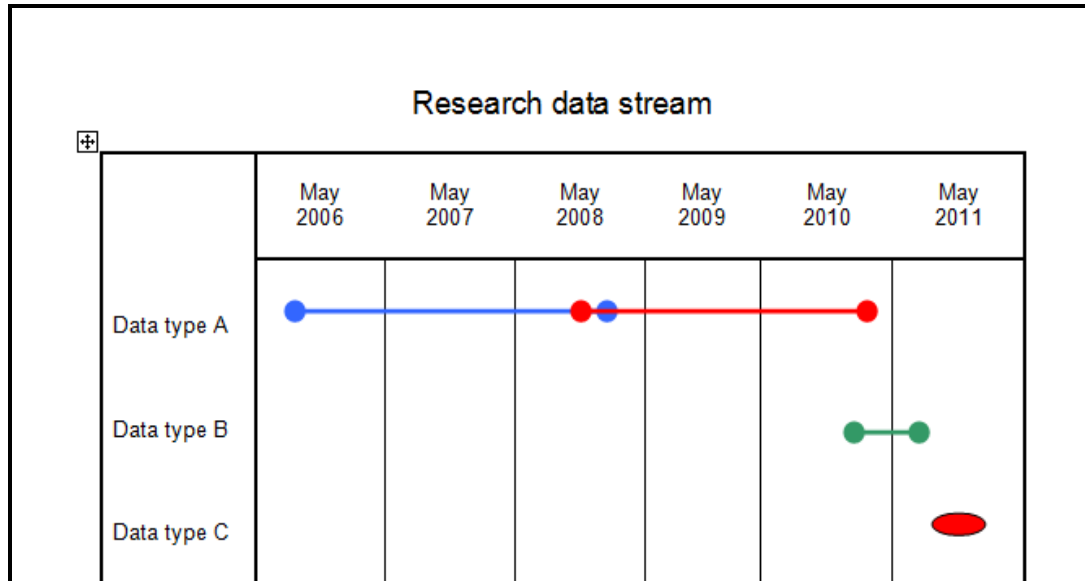


Figure 6.1: Graphical overview of data stream

Key:

- **Data type A** comprises key objective and outcome information collected from highways construction projects engaged through discrete methods (coloured blue) and highways construction projects engaged through a framework agreement (coloured red).
- **Data type B** is collated from results of a questionnaire issued to participants involved with the management of discrete and framework agreement projects.
- **Data type C** is compiled from qualitative analysis of transcripts undertaken during detailed interviews with selected participants following the questionnaire phase.

6.3 Data type A:

Data type A has been collected from a total of 164 civil engineering construction projects between the period May 2006 and August 2010. 60 of the 164 projects between the period of May 2006 and April 2008 are procured using a discreet tender process where selection is made according to standing orders of the organisation with a predominant lowest price selection criterion and a potential maximum number of 52 suppliers. The balance of 104 projects examined over a period from May 2008

until August 2010 were procured within a framework agreement engaging the services from a potential maximum number of 9 suppliers using a predominant lowest price selection criteria. Discreet projects were procured without a linked performance marking system or incentive system so each project is regarded as an independent action. Framework projects include both performance and incentive mechanisms where past performance is linked to commercial incentives.

Data type A consists of factual variables for each project included with the quantitative analysis:

- Authorised start date
- Actual start date
- Authorised finish date
- Actual finish date
- Agreed extension of time
- Completion without defects
- Submitted interim payment
- Certified interim payment
- Accepted passed health and safety inspections
- Estimated tender value
- Actual tender value
- Engagement transaction costs
- Performance monitoring transaction costs
- Total transaction costs

Definitions for each variable are stated with analysis at each stage of this research.

6.4 Data type B:

Data type B is collated from 100 questionnaires issued in November 2010 and collected in December 2010. The questionnaire contains 42 questions grouped into specific areas of research applicable to all projects contained within this case study. Data fields of the questionnaire are:

Question 1 – the participants' organisational background

Question 2 – the participants' professional background

Questions 3 to 5 – participants' involvement in frameworks, discreet contracts and marking processes

Questions 6 to 17 – single choice response to questions about participant views on discreet verses framework procurement

Questions 18 to 39 – single choice response to questions about participant views on statements related to frameworks and the discreet contracts

Questions 40 to 42 – views concerning future use of frameworks, incentives and further research.

6.5 Data type C:

Data stream for type C is collated from 10 'in-depth' interviews arranged with participants to the questionnaire process designed to represent a cross section of views from key members of the case study organisation and its suppliers. Interviews are structured to compliment and support responses from the questionnaire by providing unstructured views, comments and beliefs for the following data fields:

Questions 1 to 5 – confirmation of responses given to the questionnaire

Questions 6 to 17 – views about aspects of performance related to different procurement systems (discreet verses frameworks)

Questions 18 and 19 – views about future use of frameworks and incentives

6.6 Manipulation of raw data and tests to ensure accuracy of input

Raw data types A and B have been collated from sources indicated with results placed into spreadsheets using Microsoft Excel version 2003. All details have been checked back to back using reverse input processes and results compared for consistency. Excel files required for further processing have been transferred into Statistical Package for the Social Sciences (SPSS) version 20.0 for statistical analysis of data. Prior to use, the data has been checked again for consistency by comparing arithmetic mean output from Excel with SPSS. A further check on initial output is provided by cross checking with published organisation outputs – for example the

quarterly performance results used by the organisation for determining ranking of suppliers.

Raw data type C is obtained through approved audio recording of interviews undertaken with participants to this research. The interviews were then transcribed into Microsoft Word version 2003. Output from MS Word was then exported into QS NVivo version 9.2 for qualitative analysis. First stage processing involved a text search to identify common word usage and frequency. A synonym and thesaurus approach filtered words by grouping common meanings. This provided recognition of node analysis, allowing a web of qualitative data to be constructed. Output is referenced back from raw data by reverse checking.

6.7 Summary

Sources and metrics used to outline data and assist with data collection have been chosen to reflect professional practice and construction management convention. Data collected within the organisation concerning performance of projects is gained through operational and contractual mechanisms of the contract between the parties. This raw data is also checked by parties to a contract at regular intervals because it may have consequential financial effect if parameters exceed pre-agreed values. For example, an application of liquidated damages to a supplier through late completion requires verification of projected dates, actual dates and extensions of time. Key metrics such as start and finish dates also have liabilities attached to them and can therefore be considered as reliable.

Payment controls and cost values are taken from the organisation's internal financial management system which is subject to external scrutiny and audit. These source values are also considered reliable.

Data collated from interviews and questionnaires are tailored towards a sociological class with language and terminology reflecting respondents' knowledge and experience with construction management. Results taken from this data reflect that of the group in order to place a 'depth' to the study. Reliability rests with participant's responses but methods of data manipulation follow the same procedures as outlined for quantitative analysis.

CHAPTER 7: QUANTITATIVE STUDY: ANALYSIS OF THE EMPIRICAL FINDINGS ON THE IMPACT OF FRAMEWORK AGREEMENTS UPON PROJECT OUTCOMES

7.1 Introduction

The performance model in Chapter 4 relies upon factors that can be accurately defined and measured so that levels of performance may be compared and metric values determined. Such factors were highlighted during the literature review in Chapter 3 as ‘critical success factors’, where clients identify which specific outcomes are important in creation of success to a project. The literal review found that three to seven critical success factors provided an optimum measure of success. In all examples, elements of time, quality and cost appear with every project.

Analysis of projects within this case study starts with a review of raw data by comparing outcomes using simple statistics. These are contrasted between the two groups – discrete traditional verses framework projects – and then matched with comparable published results. This allows an initial view of recorded findings to determine if differences are worth exploring further. A series of scatterplot diagrams graphically illustrates strength of groupings or detection of bias and the like.

The case study identifies Critical Success Factors (CSF), which are defined and expanded into units of measurement, allowing data from the projects to be represented by numerical indices. Aggregation of the five CSF’s allows a Project Success Index (PSI) to be calculated.

Indices are applied to the case study projects allowing detailed statistical analysis between the two groups to be undertaken and this is explored using independent t-tests. Results are subjected to Levene’s test used to measure magnitude of variances, with discussions upon results obtained.

7.2 Classification of project success

Chapter 2 of this research identified the construction phase as the most effective period to undertake performance assessment due to availability of measurable data and the significant influence of the construction process upon project success. Public sector projects interact and involve a wide range of stakeholders – elected members,

professional and managerial officers, suppliers, sub-contractors and the general public. In addition, a public sector client organisation has to account for expenditure and selection of suppliers in accordance with statutory and European legislation.

Contextual positioning of a construction project for a private sector organisation is set within a different paradigm to that of a public sector organisation and this is reflected by determination of project success. Public sector paradigms reflect a cultural awareness of public service and openness (Johnson *et al*, (2008), p75) whereas private sector organisations relate to commercial considerations and confidentiality.

Classification of project success has varied over time and this is especially so during the last five decades (Kerzner, 1998). In the 1960's a project would be deemed successful if 'it worked' – that is, fulfilled its prime functional objective. This single descriptor of success expanded during the 1980's into the familiar 'iron triangle' outcomes of timescale, quality and cost ascribed by Atkinson (1999). If a project fulfilled all three success factors, it would be described as extremely successful whereas two factors gained moderate success. Introduction of total quality management into construction operations during the 1990's saw an expansion of measurement of success by use of various metrics. These include the wider environment within which a project sits. In his review, Atkinson (1999) introduces post completion, stakeholder involvement, operational measures and the like, as other criteria to be considered toward success.

7.3 Identification of critical success factors

As a reaction against the growing number of metrics being suggested for project performance together with the extensive resources used in collection, a counter argument is suggested. Kerzner (2001) placed this focus back with the 'iron triangle' but added secondary criteria such as minimising disruption to stakeholders, change to corporate culture and the like. Yeung *et al* (2008) modified this concept further by identifying seven key weighted indices (equivalent to critical success factors) aggregated to produce a single performance index that may be used to measure the relative success of projects. It is proposed to use this methodology to construct a project success index from critical success factors to measure the relative performance of construction projects included within this research.

7.4 Initial statistical analysis of raw data type A – project outcomes

One critical success factor, namely the ability of a supplier to complete a project as ‘right first time’ without defects, is selected for initial statistical analysis. Results from projects, expressed as a percentage of the total for each group is shown in Tables 7.1 and 7.2. ‘Yes’ means the project is completed without defects.

Table 7.1: Right first time – discrete projects 2006 to 2008

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	37	61.7	61.7	61.7
No	23	38.3	38.3	100.0
Total	60	100.0	100.0	

Table 7.2: Right first time – framework projects 2008 to 2010

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	94	90.4	90.4	90.4
No	10	9.6	9.6	100.0
Total	104	100.0	100.0	

Comparison of outcomes in Tables 7.1 and 7.2 show a considerable difference between discrete and framework projects for the critical success factor of ‘right first time’. Encouraged by differences shown for this factor, additional key project outcomes regarding project timescales were examined.

**Table 7.3: tender values, days late, duration and variances – discrete projects
2006 to 2008**

	N	Minimum	Maximum	Mean	Std. Deviation
Tender Total	60	7,454.33	5,431,096.47	507,195.0420	1,204,228.42312
Days late finished	60	0	334	47.07	68.679
Agreed initial duration (days)	60	12	728	128.67	140.687
Authorised duration (days)	60	12	910	152.70	176.847
Actual duration (days)	60	15	999	169.67	190.247
Variance between actual and authorised duration	60	-118	43	-17.03	31.590
% Variance on start	60	.0000	.6289	.041845	.0891264
% Variance on agreed finish	60	.0000	2.0000	.255688	.4157969
% Total variance	60	.0000	2.0000	.301420	.4471848
Valid N (list wise)	60				

**Table 7.4: tender values, days late, duration and variances – framework
projects 2008 to 2010**

	N	Minimum	Maximum	Mean	Std. Deviation
Tender Total	104	3,196.93	3,431,437.80	162,656.7806	430,405.67426
Days late finished	104	0	175	25.56	46.055
Agreed initial duration (days)	104	5	386	55.62	60.722
Extension of time agreed (days)	104	0	172	18.37	35.720
Authorised duration (days)	104	5	455	74.00	77.665
Actual duration (days)	104	5	413	77.77	77.598
Variance between actual and authorised duration	104	-94	42	-3.77	21.356
% Variance on start	104	.0000	.5000	.026635	.0846307
% Variance on agreed finish	104	.0000	3.0000	.143750	.3665430
% Total variance	104	.0000	3.2600	.170385	.4008436
Valid N (list wise)	104				

7.5 Simple statistical comparative results from discrete and framework projects using raw data

Tables 7.3 and 7.4 indicate percentage variances between discrete and framework projects showing differing performance outcomes between the two groups. Indications from these initial results confirm differing outcomes allowing a summary table to be produced. Table 7.5 grades results by percentage value.

Section 1 of Table 7.5 compares the percentage of projects finished on time with those finished late. A contrast with results from 36 highways projects undertaken by Graves and Rowe (1999, p11) under the *Agile Construction Initiative* showed that only 30% of projects within that specialist area were completed within contractual time scales. Traditional discrete projects contained within this research (highways related civil engineering related) by comparison only achieved a completion success of 12% whereas framework projects achieved a 64% success rate using the same measure.

Table 7.5: Headline analysis of comparative results

Section 1 Source	Projects finished early or on time	Projects finished late
Agile Construction (Graves and Rowe 1999)	30%	70%
Case study discrete projects	12%	88%
Case study framework projects	64%	36%
Section 2 Source	Projects started on time	Projects started late
Case study discrete projects	53%	47%
Case study framework projects	82%	18%
Section 3 Source	Projects finished with defects	Projects finished without defects
BEDC (1974) office buildings	46%	54%
Case study discrete projects	38%	62%
Case study framework projects	10%	90%

Section 2 of Table 7.5 shows that discrete projects started on time upon 53% of occasions, whereas those undertaken within frameworks achieved an 82% success rate. Published data has not been found to provide comparison with the case study results.

Section 3 of Table 7.5 concerns defects at completion of a project. A study undertaken by the Building Economic Development Committee (1974) using data received for office building projects found that 46% of projects had some form of defect (described as minor or major on page 23) at completion. Discrete projects within this case study produce similar results, as 38% recorded a defect at completion. By comparison those projects undertaken within frameworks produced a 10% failure rate.

7.6 Maximum values and means from raw project data

Maximum values for projects included within this case study were aggregated into a table illustrated at 7.6. The upper section of Table 7.6 represent maximum values aggregated from all projects included within the study.

Table 7.6: Maximum values and means for raw data type A

Element	Number of projects	Value of projects	Days late starting	Days late finish	Authorised days	Actual days
Discrete projects	60	£30.431M	320	1018	9162	10180
Frmwk projects	104	£16.916M	123	392	7696	8088
Element	Mean value per project	Mean days late starting per project	Mean days late finishing per project	Mean authorised days	Mean actual duration days	
Discrete projects	£507k	5.333	16.967	152.700	169.667	
Frmwk projects	£163k	1.183	3.769	74.000	77.769	
Element	Mean days late starting per project per £100k	Mean days late finishing per project per £100k	Mean authorised days per project per £100k	Mean actual duration days per project per £100k		
Discrete projects	0.0105	0.0335	0.3012	0.3346		
Frmwk projects	0.0073	0.0231	0.4540	0.4771		

The middle section of the table presents the same data as the upper section but divided by the number of projects. The lower section represents the same values further divisible per £100k financial value of the project.

Choice of means as an initial investigation allows the effect of project duration or financial value to be ascertained to see if these cause a skewed result upon the effects of late starting or completion. Results indicate that case study discrete projects are significantly larger per financial value than those undertaken through the framework. This represents changes in the capital programme during the period under study and captures variations in the nature of projects. Generally, small value projects are

proportionally of longer duration for £100k value of work than higher value projects. Causation is predominantly through the proportion of value of materials which are higher in large value projects. Irrespective of value or project duration, the mean value of days starting late or finishing late are lower for framework projects when compared to discrete projects included within this case study.

7.7 Initial investigation of relationships between elements of raw data Type A

Following initial empirical investigation of raw data type A, a series of scatterplots are used to explore relationships between variables. This method allows visual indication of variables to be explored prior to conducting detailed analysis. Linear relationships indicate a correlation of values whilst grouping of results along an axis shows strength of relationship between variables.

Within scatterplot Figures 7.1 to 7.6, the label Project Group '1' relates to results from 60 discrete pre-framework projects whereas label Project Group '2' represents results from 104 framework projects.

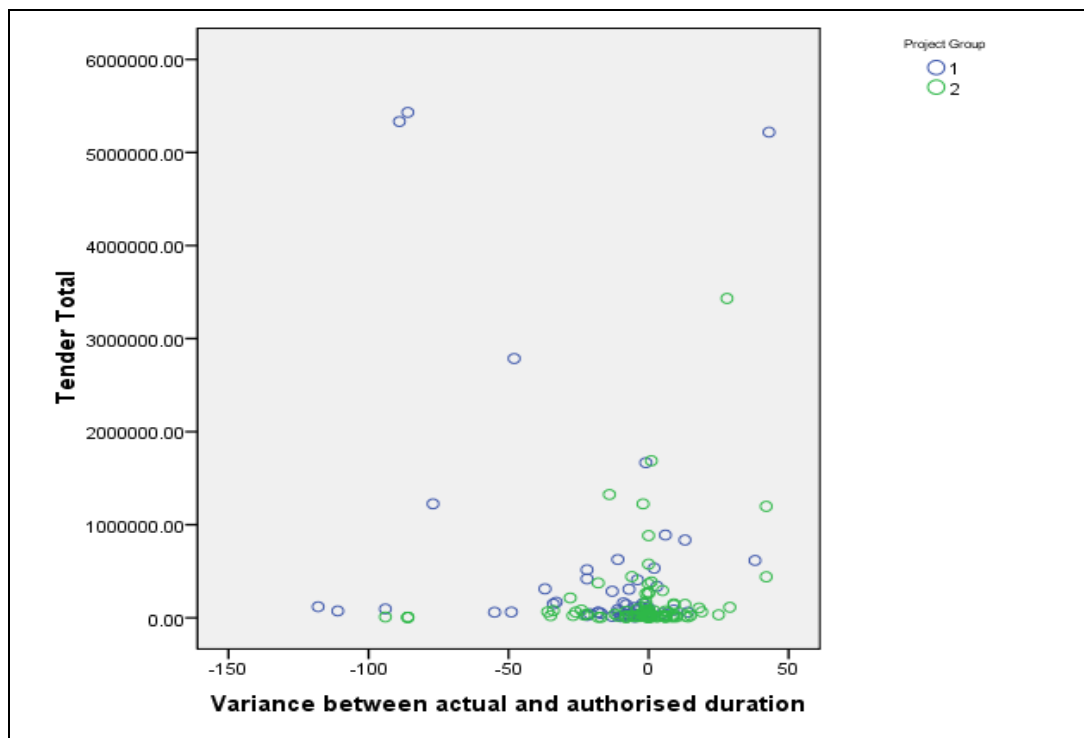


Figure 7.1: Scatterplot graph exploring relationship between tender total and variances in project duration

Conclusions from Figure 7.1:

Figure 7.1 illustrates the relationship between tender total and variance of project duration. It was anticipated that no such relationship would exist, and the scatterplot confirms this. Projects generally group around the zero value on the X axis – indicating that most projects are completed ‘at around’ the due date. This grouping acts along a vertical plane with a balanced variation of timescales irrespective of financial size of project value. The assumption that timescale variance does not correlate with project financial value is confirmed by placement of results for both discrete and framework projects.

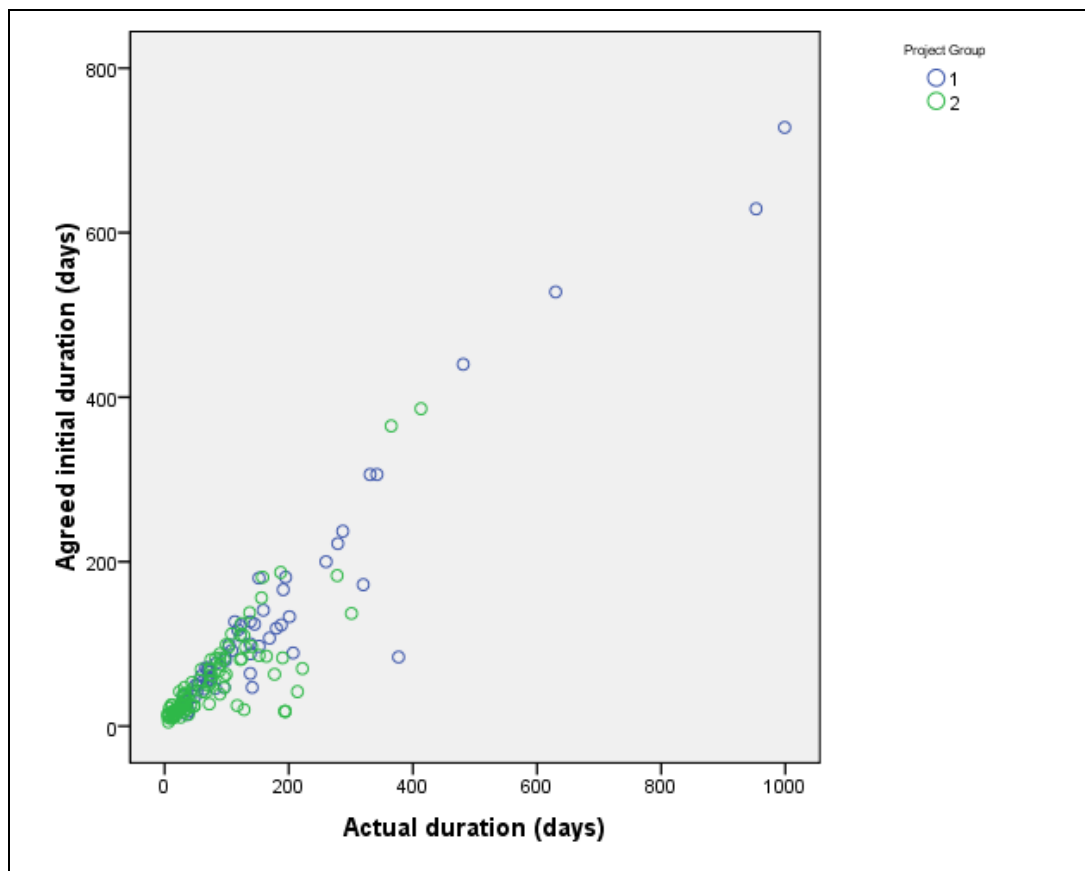


Figure 7.2: Scatterplot graph exploring relationship between agreed initial duration and actual duration for project timescales

Conclusions from Figure 7.2:

Figure 7.2 illustrates relationships between the agreed initial duration and actual project duration. It was anticipated that a relationship would exist, and a strong linear result shown by scatterplot confirms this. As most projects follow a 45 degree axis, there is strong correlation between initial and actual project timescales. Actual duration is invariably in excess of agreed duration and therefore variation is to the

right of the 45 degree axis. Grouping of results indicate that generally framework projects (group 2) are closest to the axis whereas a higher proportion of discrete (group 1) stray from the axis. Overall grouping does encourage further investigation regarding project timescales.

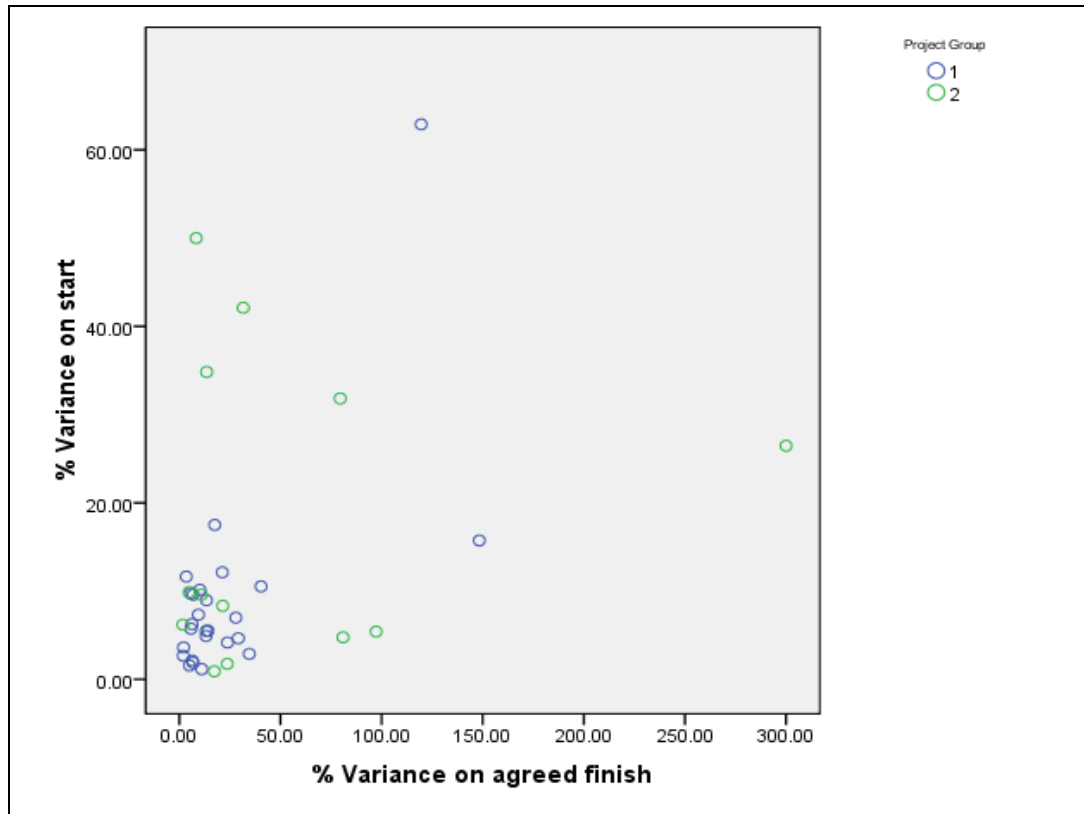


Figure 7.3: Scatterplot graph exploring relationship between variance on start and variance on finish timescales

Conclusions from Figure 7.3:

Figure 7.3 illustrates use of a scatterplot to explore a relationship between variance of start and variance of finish timescales for the projects contained within this case study. It was anticipated that no such relationship would exist - that is, a variance on start does not necessarily create a variance on the finish date of a project. Although projects are generally grouped around the zero value on the X/Y axis, the grouping has a wide series of points indicating that results are scattered. There is also no discernable difference between the project groups. Assumptions made of 'no variance relationship' between start and finish timescales for both discrete and framework projects are confirmed by distribution of results in Figure 7.3.

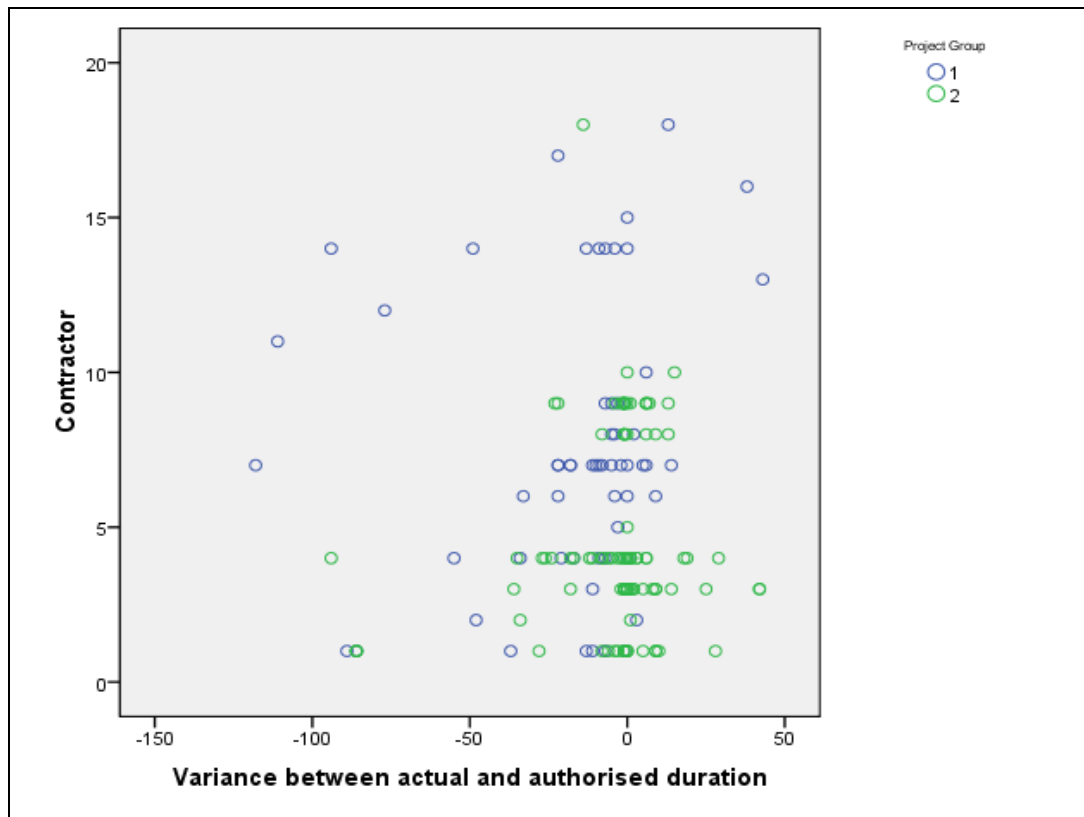


Figure 7.4: Scatter plot graph exploring relationship between supplier (contractor) and variances in project timescales

Conclusions from Figure 7.4:

Figure 7.4 illustrates use of a scatterplot to explore a relationship between a particular supplier and variance of project duration. Each supplier was allocated a reference number in order to determine if the choice of supplier affected variance of timescales. This was an attempt to identify if a particular supplier regularly underperformed with project duration. It was anticipated that no single supplier would substantially under perform and the scatterplot confirms this. Projects generally group around the zero value on the X axis with a predominantly vertical plane. Variances appear more widely dispersed with discrete projects but the assumption that timescale variance does not relate to a sole individual supplier is confirmed for all projects.

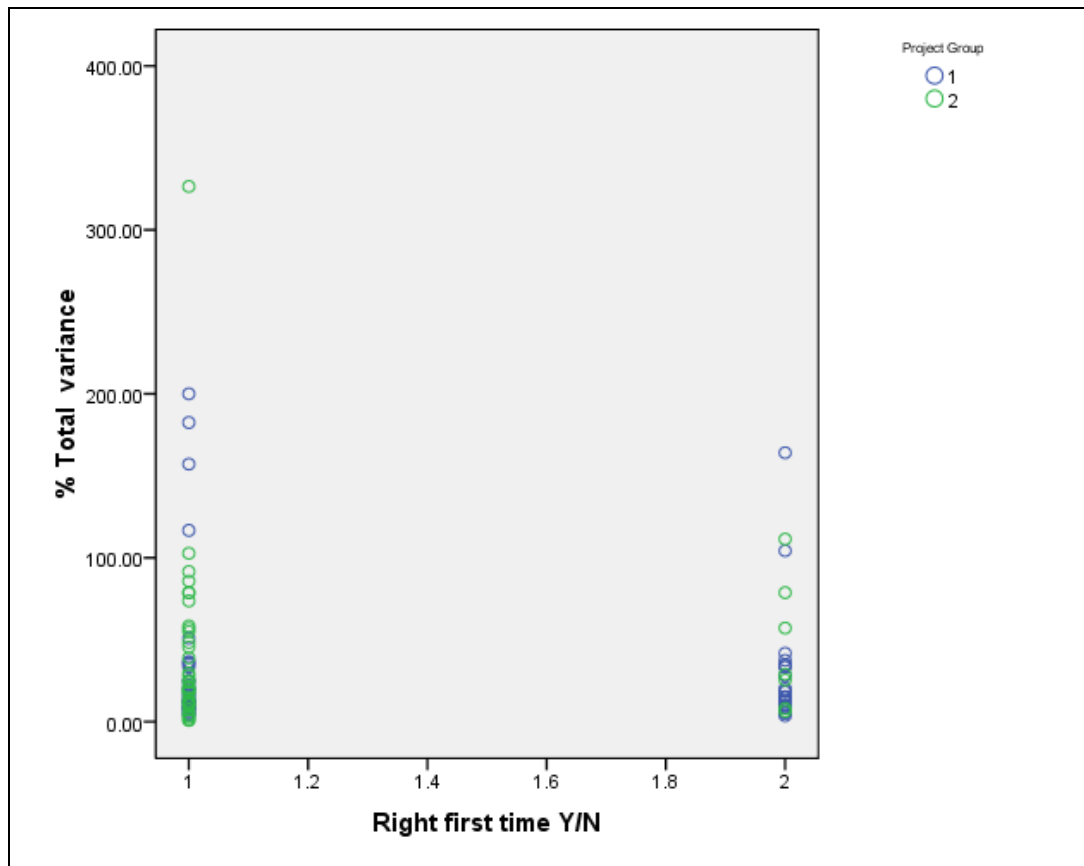


Figure 7.5: Scatterplot graph exploring relationship between variances in project timescales and right first time

Conclusions from Figure 7.5:

Figure 7.5 illustrates use of a scatterplot to explore a relationship between total variance of project duration and right first time. It was anticipated that variances in project timescales would not have any correlation with 'right first time' (no defects at completion). The scatterplot polarises the X axis because value 1 = no defects at completion and value 2 = defects at completion. Polarisation of 'right first time' is distinct from the time variances because if such correlation existed then the mix of groups 1 and 2 would be indistinct and marginal as with scatterplot Figure 7.3. Figure 7.5 shows a higher number of projects within the framework group as being completed 'right first time'. The assumption that timescale variance does not correlate with 'right first time' is confirmed by results shown in Figure 7.5.

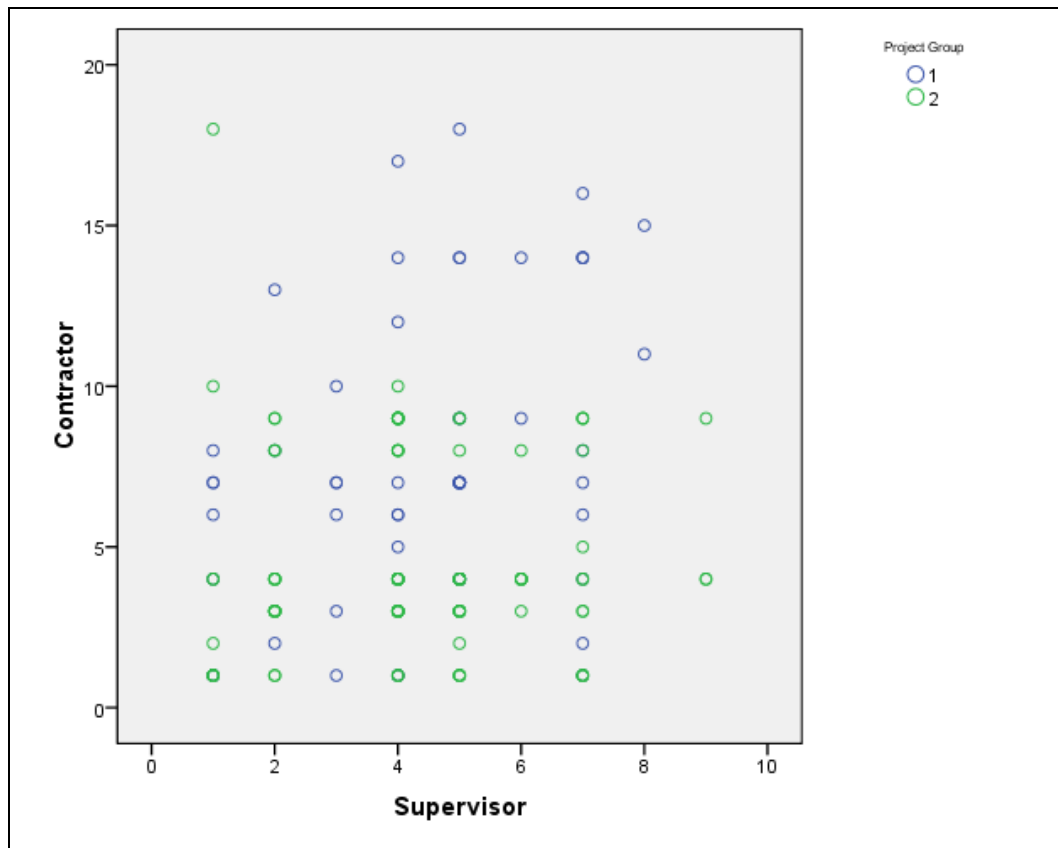


Figure 7.6: Scatterplot graph exploring relationship between supplier (contractor) and supervisor

Conclusions from Figure 7.6:

Figure 7.6 illustrates use of a scatterplot to explore a relationship between supplier and supervisor. The purpose of this investigation was to detect bias between a particular supplier and supervisor in terms of scoring key performance metrics or any favouritism in awarding contractual certificates for timescales. Although not all projects (discrete and frameworks) have been supervised by all engineers, nor all suppliers gained a place on the frameworks – use of a scatterplot allowed a graphical view of supervisors and suppliers to be undertaken. It was anticipated that no bias (positive or negative) would exist because this has not been detected during the questionnaire or interview process. As values are categorical, the results are not displayed as linear, but as polarised points. The scatterplot provides a useful graphical detection device for patterns around these points. It was expected that the scatter would be wider for discrete projects because the number of suppliers and supervisors are larger and this is displayed. Within these constraints however there is no discernible pattern of relationship. An assumption that neither relationship, nor bias exists between supplier and supervisor appears confirmed.

7.8 Detailed analysis of quantitative study

The examination of raw data type A has identified areas for further analysis and confirmed a number of assumptions made concerning relationships between data. Six scatterplots have explored the relationships between project values, timescales, variances to project durations and the independence of data (omission of bias). These discoveries, together with calculation of project arithmetic means provide a foundation to explore the data further. In order to provide greater depth of understanding through exploration of relationships between data, an assessment is made to determine project success. Project success for the construction industry is made by reference to published research, allowing for the recognition of critical success factors by this study.

7.9 Critical success factors and project success index used for this research

Yeung *et al* (2008) proposed quantitative indicators that could be adapted for collaborative projects by use of client organisations. Structured interviews with clients conducted in Hong Kong provided seven indicators to reflect the most important key performance criteria. A summation of this research is provided in Table 7.7.

Table 7.7: Key performance indicators adapted from Yeung *et al* (2008)

Weighting	Key Performance Indicator	Quantitative Indicator
0.167	Time performance	Variation in time against programme
0.160	Cost performance	Variation in cost against budget
0.150	Management commitment	Percentage of meetings attended by project managers and directors
0.143	Quality performance	Cost of rectifying defects or number of defects, number of complaints
0.143	Trust and respect	Speed of resolving disputes, satisfaction scores
0.131	Communication	Number of letters and emails sent between parties
0.106	Innovation	Cost and time savings expressed as a percentage of project totals

Yeung's indicators form critical success factors – with outcomes that are deemed by a client as making a project successful. There can be no limit to the number of success factors chosen by a client but conclusions reached by Yuan *et al* (2009) regarding selection of performance objectives and key performance indicators allied to public-private partnerships, determined that the amount of collected data (key performance indicators) needs to be low in order to be manageable and effective. This also requires a consensus between conflicting objectives from stakeholders.

The model proposed by Yeung *et al* (2008) recognises a strong correlation to traditional views of performance to price, time and quality – but introduces four other critical success factors, albeit with lesser weightings. Validation of the model was achieved through the research, but conclusions made by Yeung *et al* recognised the need to produce specific critical success factors for different clients and varied project situations. It would also be for the client and his advisory team to decide the importance of each factor by choosing a weighted apportionment.

Identification of critical success factors for this research was obtained through group meetings with officers of the organisation, where both identification of a critical success factor and weighted apportionment was decided to reflect project outcomes. As the organisation already enjoyed a good reputation of financial management

(Audit Commission, 2009), out turn value of projects was not a prime concern. A strong link between performance of projects and corporate priorities was necessary and development of these objectives is shown at Appendix 1. Appendix 1 explains a relationship between organisational priorities and how these are achieved by performance of projects:

- Four corporate priorities define the organisation
- Four highways and transport objectives support the priorities
- Nine actions with construction projects support the objectives

As the organisation ‘takes for granted’ that projects will be delivered to time, in accordance with budget provisions and to the required specification, critical success factors form a secondary role by enhancing overall project delivery. During January 2006, seven factors were identified as critical to the success of a project as judged by an independent panel of technical officers. These factors were attributed with weightings identified according to relevance with project delivery. The seven factors identified are listed in Table 7.8.

Table 7.8: Rank order of critical success factors initial identification

Rank	Critical success factor	Weighting	Description of Metric
1	Predictability of time	0.25	Measure of starting on time and completion on time (aggregation of results)
2	Accuracy of payment submissions	0.20	Interim payments made within 5% of application
3	Site safety inspections	0.15	Percentage of inspections passing minimum standards
3	Right first time	0.15	Projects completed without remedial works
5	Waste recycling rate	0.10	Improvement in recycling rate of material used
5	TMA compliance	0.10	Projects completed in accordance with act
7	Fleet CO2 emissions	0.05	Reduction in year on year per project
		1.00	

Within a short period of time, a number of changes had to be made to chosen critical success factors due to a combination of legislative and operational changes. TMA

compliance (CSF5) was removed from supplier's responsibilities due to changes in highways law and fleet CO2 emissions (CSF7) and waste recycling rates (CSF5) were taken into control by the client organisation. The panel of technical officers reconvened in March 2006 and revised critical success factors with amended weightings. The revised critical success factors used for this research are shown in Table 7.9.

Table 7.9: revised critical success factors identified by the organisation and used for analysis with this research

CSF Number	Critical success factor	Weighting	Description of Metric
1A	Ratio of start on time	0.165	Ratio of days late starting against contract period
1B	Ratio of finish on time	0.165	Ratio of days finished late against contract period
2	Ratio of accuracy of payments	0.270	Interim payments certified within 5% of suppliers application
3	Right first time	0.200	Projects completed without remedial works – yes scored 1, no scored 0
4	Health and safety inspections	0.200	Percentage of inspections passed
		1.00	

In addition to critical success factors, the organisation set minimum and stretching value targets in order to place a gearing for achieving improved performance. The purpose of minimum and stretching targets is to provide a bias towards a higher score for performance on a proportional geared basis. If a supplier falls below the minimum standard, a negative result occurs and the critical success factor reverts to zero.

From this information, a project success index may be calculated for this research using the following formula:

$$\text{Project success index} = \sum \frac{(\text{AS} - \text{MV}) \text{We}}{(\text{SV} - \text{MV})}$$

Where:

Project success index = measure of success of a project

AS = Actual Score of the critical success factor being measured in accordance with the measurement definitions

MV = Minimum percentage value of the critical success factor

SV = Stretching percentage value of the critical success factor

We = Weighting of the critical success factor

Any negative integers are valued at zero

7.10 Expansion of the project success index for the five critical success factors

The project success index formula is expanded into its full expression by inclusion of minimum and stretching target values used for this research:

$$\begin{aligned} \text{Project success index} = & \frac{(\text{AS1A} - \text{MV1A}) \text{We1A}}{(\text{SV1A} - \text{MV1A})} + \frac{(\text{AS1B} - \text{MV1B}) \text{We1B}}{(\text{SV1B} - \text{MV1B})} \\ & + \frac{(\text{AS2} - \text{MV2}) \text{We2}}{(\text{SV2} - \text{MV2})} + \frac{(\text{AS3} - \text{MV3}) \text{We3}}{(\text{SV3} - \text{MV3})} \\ & + \frac{(\text{AS4} - \text{MV4}) \text{We4}}{(\text{SV4} - \text{MV4})} \end{aligned}$$

Where:

Project success index = measure of success of a project or participant

AS1A = Actual Score of the ratio for starting on time

MV1A = Minimum percentage value for starting on time (value = 75)

SV1A = Stretching percentage value for starting on time (value = 100)

We1A = Weighting of critical success factor for starting on time (value = 0.165)

AS1B = Actual Score of the ratio for finishing on time

MV1B = Minimum percentage value for finishing on time (value = 75)

SV1B = Stretching percentage value for finishing on time (value = 100)

We1B = Weighting of critical success factor for finishing on time (value = 0.165)

AS2 = Actual Score of the ratio for accuracy of payments

MV2 = Minimum percentage value of the ratio for accuracy of payments (value = 70)

SV2 = Stretching percentage value of the ratio for accuracy of payments (value = 100)

We2 = Weighting of critical success factor for accuracy of payments (value = 0.270)

AS3 = Actual Score of the indicator for right first time – yes result = 100, no result = 0

MV3 = Minimum percentage value for indicator for right first time (value = 50)

SV3 = Stretching percentage value for indicator for right first time (value = 100)

We3 = Weighting of critical success factor for right first time (value = 0.200)

AS4 = Actual Score of the ratio of health and safety inspections

MV4 = Minimum percentage value of health and safety inspections (value = 75)

SV4 = Stretching percentage value of health and safety inspections (value = 100)

We4 = Weighting of critical success factor of health and safety inspections (value = 0.200)

Any negative integers are valued at zero

7.11 Calculation of critical success values in this research

Each critical success factor is expanded by definition placing boundaries upon **what** is being measured; and this is followed by a method of measurement describing **how** the factor is measured. Sources of evidence are given and a calculation used to assign values.

7.11.1 AS1A Value of start on time

A requirement to start on time is a critical success factor due to public visibility of highways infrastructure projects. A statutory requirement with the Traffic Management Act 2004 uses ‘road space booking’ to undertake works, making stakeholders acutely aware of the anticipated commencement dates. Calculation of the value of start on time for this research uses the following definitions and sources of data within its construct:

Agreed works start date:

Sourced from a contractual letter sent to a supplier and stated in the contract for commencement of a project.

Actual start date:

Sourced from contemporary site records and the Traffic Management Act notice for commencement on site.

Days late starting:

The difference between 'agreed works start date' and 'actual start date'. Late starting is progressive and proportional – the organisation views the number of days late as relevant against the whole contract period.

Formula for calculation of days late starting = Actual start date – Agreed works start date

Agreed initial duration:

A difference between 'agreed works start date' and 'agreed initial completion date' in days. This represents, using a numerical value, the initial contract period.

Formula for calculation of agreed initial duration = Agreed works start date – Agreed initial completion date

Extension of Time or Compensation Event days:

Represents the number of days by which an original contract period is extended by the Resident Engineer or Supervisor in accordance with the conditions of contract. Generally these arise from additional work or variations requested by a client, but occasionally adverse weather conditions and other specified permitted circumstances also allow a contract period to be extended. All awards of extension of time are strictly contractual and are compiled from letters issued to a supplier.

Percentage variance on start date:

The percentage variance on start date is calculated by dividing the number of ‘days late starting’ by the ‘agreed initial duration’ plus the ‘extension of time or compensation event days’.

Formula for percentage variance on start date = Days late starting / (Agreed initial duration + extension of time or compensation event days)

7.11.2 AS1B Value of finish on time

A critical success factor relevant to virtually all client organisations is the requirement to finish a project on time. This is particularly so in the public arena where stakeholders are also interested with completion of works. Calculation of the value and sources of data for finish on time are:

Agreed initial completion date:

Date of the works for completion as detailed within the contract documents and confirmed by a letter to a supplier.

Actual works end date:

Date of the works acceptance by a Supervisor in accordance with the conditions of contract and supported by a letter of completion.

Agreed initial duration:

A difference between ‘agreed works start date’ and ‘agreed initial completion date’ in days. This represents, using a numerical value, the initial contract period.

Formula for calculation of agreed initial duration = Agreed works start date – Agreed initial completion date

Extension of Time or Compensation Event days:

As previously described for critical success factor 1A.

Percentage variance on agreed finish date:

The percentage variance on agreed finish date is calculated by deducting the ‘extension of time or compensation event days’ from the ‘initial completion date’ and ‘actual end dates’ and dividing the result by the ‘extension of time or compensation event days’ plus the ‘agreed initial duration’. Within the context of this research, finishing a project early is not beneficial to the client so therefore the default value for finishing early or on time is zero.

Formula for calculation of percentage variance on agreed finish date = ((Initial completion date – Actual end date) – Extension of time or compensation event days) / (Extension of time or compensation event days + Agreed initial duration)

7.11.3 AS2 Value of accuracy of payments

This critical success factor for payments does not refer to comparison of ‘out turn’ cost against budget allowance but relates to anticipated changes in expenditure as work progresses in order to comply with monitoring requirements. Accuracy of payments places onus upon commercial representatives of a supplier (often a quantity surveyor) and a certifying officer (client’s representative) to meet and agree the value of interim certificates. The purpose of this is two fold:

- To provide an early warning to parties of any known changes in expenditure and allow an agreement process to be initiated and managed.
- To prevent a supplier issuing an interim application for payment without checking values with a supervisor prior to issue of contractual certificates.

Calculation of values for accuracy of payments together with sources of data is:

Accuracy of payments:

The defined metric for accuracy of payments is that an application from a supplier is within 5% of the certified value made by the supervisor. Sources of evidence used by this research examine payment certificates for each project in accordance with the conditions of contract. Each payment certificate has two values:

a = net value of monetary application from supplier.

b = net value of monetary payment certified.

If $a/b = 0.95$ to 1.05 , then the payment is considered a successful one.

Formula for calculation of accuracy of payments = Number of successful payments/Number of total payments

7.11.4 AS3 Value of right first time

Ensuring that projects are completed right first time is a critical success factor to a client. Apart from the costs of rectifying defective work, public sector projects are subject to stakeholder visibility. Within this research, 'right first time' occurs when a project is completed without the need for remedial work. Remedial work is defined as any work requiring a return visit to a project after completion as notified by the Resident Engineer or Supervisor. Remedial work does not include minor snagging items that are resolved prior to departure from site (because this is permitted under the terms of the contract). Data sources for 'right first time' are made by reference to completion certificates, lists of defects at completion and site diaries. Results from this data are a simple binary result:

Project completed without defects = 1

Project completed with defects = 0

7.11.5 AS4 Value of health and safety inspections

Health and safety within a construction project is applied through a regulatory framework derived from the Health and Safety at Work Act 1974. Supplementary legislation from Construction Design and Management 2007 regulations are supported by minimum standards required through conditions of contract and specification. Source data for this research is through documentary evidence of inspections made. Response from data is a simple binary result:

Site health and safety inspection passed = 1

Site health and safety inspection failed = 0

Formula for calculation of health and safety inspections = Number of inspections passed/Number of inspections failed

7.12 Analysis of results – structure and descriptors

Results from the raw data showing outcomes of projects in Appendix 9 have been synthesised into five critical success factors stated in Table 7.8. Outcomes are calculated as numerical values described in paragraphs 7.9.1 to 7.9.5 and weighted in accordance with ratios in Table 7.8. Aggregation of weighted critical success factors allows a project success index to be given by numerical value. A data sheet for all projects showing CSF's and PSI's is at Appendix 10.

In order to statistically explore relationships between the two groups – discrete and framework projects - independent samples t-tests are applied to values taken from the data sheet. With all t-tests the following descriptors are applied:

- Dependant variables are measured at interval levels using continuous results.
- The projects represent all of the population of highways infrastructure schemes undertaken by the organisation between May 2006 and December 2010.
- All observations are independent of one another and supported by independent evidence. There is no interaction between results from any of the five critical success factors and random sampling confirms this.
- The populations are assumed to be statistically normally distributed.

7.13 Variations to results caused by project characteristics

Studies into outcomes with projects in the construction industry tend to aggregate results in a simple form, with only a cursory review of the characteristics that may affect performance. This is often due to the limitations of research methods used or quality of available data (Molenaar and Songer, 1998). Hair *et al*, (2006) recognised that projects with mixed characteristics included within an independent variable would only show a single relationship. The effect of project characteristics upon project performance formed a study undertaken by Cho *et al*, (2009) with conclusions that a few characteristics could significantly affect performance. The

study indicated that a client variable has the largest variance with performance, followed by style of construction management applied and then environmental considerations.

Favie and Maas (2008) approach project characteristics from a slightly differing viewpoint by analysing published literature and engaging with a panel of experts to determine a rank of importance. From a list of 43 recognised characteristics, a 'top ten' order of importance is included with Table 7.10 together with an assessment of relevance to this research.

Table 7.10: Project characteristics and relevance to this research

Rank/Characteristic	Descriptor	Accept/reject as variable
1 Complexity	Differentiation of projects that are considered complex by programming or sequencing	All projects within this case study are comparable in terms of complexity and therefore no variable exists
2 Size (value)	Differentiation between projects by contract values	Group projects by value bands as a variable
3 Political placement (Client)	Differentiate between different clients	All projects are for a single public sector client so no variable exists
4 Timescales/restricted working hours	Separate projects that are significantly different in restriction	Apart from very minor elements of work governed by restrictive hours, all projects are undertaken within normal working hours so no variable exists
5 Type (housing, infrastructure)	Differentiate between different project types	All projects are within the category of civil engineering highway infrastructure – no variation in type
6 Form of contract	Separate projects with different forms of contract	All case study projects use NEC3 conditions of contract – no variable exists
7 Location, region	Group projects by location or region	All projects are located within a 30 mile radius of Winchester, UK – no variable exists
8 Technological advancement	Separate projects by technological classification	All projects are to the same technological classification using standard construction methods – no variable applicable
9 Project life cycle	Group projects by life cycle	All projects have a conventional life span so no variable exists
10 Quality or specification	Separate projects by specification type	All projects are to the same highways specification (MCHW) – no variables exist

Applying conclusions made by Cho *et al* (2009) and Favie and Maas (2008) to this research, nine out of ten project characteristics contained in this case study do not produce variables that affect performance results. A single variable that may have such effect is the financial contract value size of a project. In order to ascertain whether project value influences outcomes, independent samples t-tests are undertaken at two stages. Stage One uses data from all 164 projects whilst Stage Two matches 60 discrete projects with 60 framework projects according to closest contract value. Stage Two projects were closely matched for size according to contract value. 60 discrete projects of a total value of £30,431,702.52 (mean = £507,195.04) with 60 framework projects of a total value of £16,403,695.97 (mean = £273,394.93) were selected for analysis. This was deemed a comparable match because minor projects under the framework arrangements (generally less than £21,000.00) do not represent median values.

7.14 Analysis of results – Stage One independent samples t-tests

All projects included within this research are shown in Table 7.11 as group statistics.

Table 7.11: Group statistics for all 164 projects

Stage One - Group Statistics					
	Discrete or framework project	N	Mean	Std. Deviation	Std. Error Mean
CSF1A result	Discrete project	60	.15810	.014705	.001898
	Framework project	104	.16061	.013977	.001371
CSF1B result	Discrete project	60	.12952	.047085	.006079
	Framework project	104	.14450	.040988	.004019
CSF2 result	Discrete project	60	.10733	.054185	.006995
	Framework project	104	.25099	.038087	.003735
CSF3 result	Discrete project	60	.12333	.098060	.012660
	Framework project	104	.18077	.059246	.005810
CSF4 result	Discrete project	60	.15886	.044564	.005753
	Framework project	104	.18715	.041544	.004074
Project success index	Discrete project	60	.677139	.1492751	.0192713
	Framework project	104	.924022	.0920211	.0090234

Independent samples t-tests are applied to results from the data sheet using selection of two variables – one categorical independent variable representing each group (discrete or framework projects), one continuous independent variable (CSF score value) and one continuous dependent variable (PSI score value).

Table 7.12: Stage One independent samples t-tests for 164 discrete and framework projects

Stage One - Independent Samples Test										
		Levene's Test for Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
CSF1A result	Variances assumed	.133	.716	-1.088	162	.278	-.002513	.002310	-.007073	.002048
	Variances not assumed			-1.073	118.146	.285	-.002513	.002341	-.007149	.002124
CSF1B result	Variances assumed	.565	.453	-2.134	162	.034	-.014984	.007021	-.028849	-.001120
	Variances not assumed			-2.056	109.839	.042	-.014984	.007287	-.029426	-.000542
CSF2 result	Variances assumed	2.110	.148	-19.857	162	.000	-.143664	.007235	-.157951	-.129377
	Variances not assumed			-18.117	93.095	.000	-.143664	.007930	-.159411	-.127917
CSF3 result	Variances assumed	82.613	.000	-4.679	162	.000	-.057436	.012276	-.081677	-.033195
	Variances not assumed			-4.124	84.325	.000	-.057436	.013929	-.085133	-.029738
CSF4 result	Variances assumed	15.224	.000	-4.089	162	.000	-.028286	.006917	-.041946	-.014627
	Variances not assumed			-4.013	116.254	.000	-.028286	.007049	-.042248	-.014324
Project success index	Variances assumed	32.698	.000	-13.107	162	.000	-.2468829	.0188359	-.2840784	-.2096874
	Variances not assumed			-11.602	85.356	.000	-.2468829	.0212792	-.2891892	-.2045766

7.15 Interpretation of Stage One independent samples t-tests

A test for equality (Levene, 1960) is used to determine whether the same variance of scores occur for both groups. The outcome of this test decides which value to use for calculating the effect size. If the Sig. value exceeds 0.05 then 'equal variances assumed' is used. If the Sig. value is 0.05 or less, then 'equal variances not assumed' value is used. The relevant t-test value is used to calculate effect size to provide an indication of the magnitude of difference between the groups. For all independent t-tests, an Eta squared formula is used to determine effect size with values between 0 and 1 to represent the proportion of variance in the dependant variable compared with the independent group variable. The Eta squared formula is:

$$\text{Eta squared} = \frac{t^2}{t^2 + (N1 + N2 - 2)}$$

7.15.1 Interpretation for CSF1A – Starting on time:

Cohen (1998) proposes guidelines for interpretation of the Eta squared values. These are: 0.01=Small differences, 0.06=Moderate difference, 0.14=Large difference.

$$\begin{aligned} \text{Eta squared for CSF1A} &= \frac{-1.088^2}{-1.088^2 + (60 + 104 - 2)} \\ \text{Eta squared for CSF1A} &= 0.007 \end{aligned}$$

An independent t-test was used to compare the 'starting on time' critical success factor scores for discrete versus framework projects. There was no significant difference in scores for discrete projects (M=0.158, SD=0.014) and framework projects (M=0.160, SD=0.014), t (162) = -1.088, p=0.278). The magnitude of the differences in the means was very small (0.007).

7.15.2 Interpretation for CSF1B – Finishing on time:

$$\begin{aligned} \text{Eta squared for CSF1B} &= \frac{-2.134^2}{-2.134^2 + (60 + 104 - 2)} \\ \text{Eta squared for CSF1B} &= 0.0273 \end{aligned}$$

An independent t-test was used to compare the ‘finishing on time’ critical success factor scores for discrete verses framework projects. There was a difference in scores for discrete projects ($M=0.130$, $SD=0.047$) and framework projects ($M=0.145$, $SD=0.041$), $t(162) = -2.134$, $p=0.034$). The magnitude of the differences in the means was small to moderate (0.027).

7.15.3 Interpretation for CSF2 – Accuracy of payments:

$$\begin{aligned} \text{Eta squared for CSF2} &= \frac{-19.857^2}{-19.857^2 + (60 + 104 - 2)} \\ \text{Eta squared for CSF2} &= 0.709 \end{aligned}$$

An independent t-test was used to compare the ‘accuracy of payments’ critical success factor scores for discrete verses framework projects. There was a significant difference in scores for discrete projects ($M=0.1073$, $SD=0.054$) and framework projects ($M=0.2510$, $SD=0.038$), $t(162) = -19.857$, $p=0.000$). The magnitude of the differences in the means is a large effect (0.709).

7.15.4 Interpretation for CSF3 – Right first time:

$$\begin{aligned} \text{Eta squared for CSF3} &= \frac{-4.124^2}{-4.124^2 + (60 + 104 - 2)} \\ \text{Eta squared for CSF3} &= 0.095 \end{aligned}$$

An independent t-test was used to compare the 'right first time' critical success factor scores for discrete verses framework projects. There was a significant difference in scores for discrete projects ($M=0.123$, $SD=0.098$) and framework projects ($M=0.181$, $SD=0.059$), $t(162) = -4.124$, $p=0.000$. The magnitude of the differences in the means was moderate to large (0.095).

7.15.5 Interpretation for CSF4 – Health and safety inspections:

$$\begin{aligned} \text{Eta squared for CSF4} &= \frac{-4.013^2}{-4.013^2 + (60 + 104 - 2)} \\ \text{Eta squared for CSF4} &= 0.090 \end{aligned}$$

An independent t-test was used to compare the 'health and safety inspection' critical success factor scores for discrete verses framework projects. There was a significant difference in scores for discrete projects ($M=0.159$, $SD=0.045$) and framework projects ($M=0.187$, $SD=0.042$), $t(162) = -4.013$, $p=0.000$. The magnitude of the differences in the means was moderate to large (0.090).

7.15.6 Interpretation for PS index – Project Success Index:

$$\begin{aligned} \text{Eta squared for PSI} &= \frac{-11.602^2}{-11.602^2 + (60 + 104 - 2)} \\ \text{Eta squared for PSI} &= 0.454 \end{aligned}$$

An independent t-test was used to compare the 'project success index' factor scores for discrete verses framework projects. There was a significant difference in scores

for discrete projects ($M=0.677$, $SD=0.149$) and framework projects ($M=0.924$, $SD=0.092$), $t(162) = -11.602$, $p=0.000$). The magnitude of the differences in the means was large (0.454).

7.16 Analysis of results – Stage Two independent samples t-tests

An exploration of the effects of project size by value was undertaken by compiling two groups matched closely for size according to contract sum. 60 discrete projects of a total value of £30,431,702.52 (mean = £507,195.04) with 60 framework projects of a total value of £16,403,695.97 (mean = £273,394.93). Although mean values are slightly skewed it was proposed that removal of very small projects (generally less than £21,000.00) would enable a realistic comparison to be made. Group statistics for the 120 discrete and framework projects are shown in Table 7.13.

Table 7.13: Group statistics for 120 discrete and framework projects

Stage Two - Group Statistics					
Discrete or framework project		N	Mean	Std. Deviation	Std. Error Mean
CSR1A result	Discrete project	60	.15810	.014705	.001898
	Framework project	60	.16135	.011002	.001420
CSR1B result	Discrete project	60	.12952	.047085	.006079
	Framework project	60	.14776	.036402	.004699
CSF2 result	Discrete project	60	.10733	.054185	.006995
	Framework project	60	.23968	.044942	.005802
CSF3 result	Discrete project	60	.12333	.098060	.012660
	Framework project	60	.17000	.072017	.009297
CSF4 result	Discrete project	60	.15886	.044564	.005753
	Framework project	60	.18939	.032726	.004225
Project success index	Discrete project	60	.677139	.1492751	.0192713
	Framework project	60	.908174	.0939301	.0121263

As with Stage One, independent samples t-tests are applied to results from the data sheet using selection of two variables – one categorical independent variable representing each group (discrete or framework projects), one continuous

independent variable for CSF values and one continuous dependant variable for PSI score values).

Table 7.14: Stage Two independent samples t-tests for 120 discrete and framework projects

Stage Two - Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
CSR1A result	Equal variances assumed	1.134	.289	-1.371	118	.173	-.003251	.002371	-.007947	.001444
	Equal variances not assumed			-1.371	109.295	.173	-.003251	.002371	-.007951	.001448
CSR1B result	Equal variances assumed	2.387	.125	-2.374	118	.019	-.018239	.007683	-.033454	-.003024
	Equal variances not assumed			-2.374	110.964	.019	-.018239	.007683	-.033464	-.003014
CSF2 result	Equal variances assumed	.104	.748	-14.563	118	.000	-.132350	.009088	-.150347	-.114353
	Equal variances not assumed			-14.563	114.100	.000	-.132350	.009088	-.150354	-.114347
CSF3 result	Equal variances assumed	37.138	.000	-2.971	118	.004	-.046667	.015707	-.077770	-.015563
	Equal variances not assumed			-2.971	108.302	.004	-.046667	.015707	-.077799	-.015534
CSF4 result	Equal variances assumed	31.300	.000	-4.277	118	.000	-.030528	.007138	-.044663	-.016393
	Equal variances not assumed			-4.277	108.299	.000	-.030528	.007138	-.044676	-.016380
Project success index	Equal variances assumed	23.369	.000	-10.147	118	.000	-.2310352	.0227691	-.2761242	-.1859461
	Equal variances not assumed			-10.147	99.390	.000	-.2310352	.0227691	-.2762118	-.1858585

7.17 Interpretation of Stage Two independent samples t-tests

As with interpretation for Stage One results, Levene's test for equality is used to determine variance of scores for both groups at Stage Two.

7.17.1 Interpretation for CSF1A – Starting on time:

$$\begin{aligned} \text{Eta squared for CSF1A} &= \frac{-1.371^2}{-1.371^2 + (60 + 60 - 2)} \\ \text{Eta squared for CSF1A} &= 0.016 \end{aligned}$$

An independent samples t-test was used to compare the 'starting on time' critical success factor scores for discrete verses framework projects. There was no significant difference in scores for discrete projects ($M=0.158$, $SD=0.014$) and framework projects ($M=0.161$, $SD=0.011$), $t(118) = -1.371$, $p=0.173$. The magnitude of the differences in the means was small (0.016).

7.17.2 Interpretation for CSF1B – Finishing on time:

$$\begin{aligned} \text{Eta squared for CSF1B} &= \frac{-2.374^2}{-2.374^2 + (60 + 60 - 2)} \\ \text{Eta squared for CSF1B} &= 0.046 \end{aligned}$$

An independent samples t-test was used to compare the 'finishing on time' critical success factor scores for discrete verses framework projects. There was no significant difference in scores for discrete projects ($M=0.130$, $SD=0.047$) and framework projects ($M=0.148$, $SD=0.036$), $t(118) = -2.374$, $p=0.019$. The magnitude of the differences in the means was moderate (0.046).

7.17.3 Interpretation for CSF2 – Accuracy of payments:

$$\begin{aligned} \text{Eta squared for CSF2} &= \frac{-14.563^2}{-14.563^2 + (60 + 60 - 2)} \\ \text{Eta squared for CSF2} &= 0.643 \end{aligned}$$

An independent samples t-test was used to compare the ‘accuracy of payments’ critical success factor scores for discrete verses framework projects. There was a significant difference in scores for discrete projects ($M=0.1073$, $SD=0.054$) and framework projects ($M=0.2397$, $SD=0.045$), $t(118) = -14.563$, $p=0.000$. The magnitude of the differences in the means is a large effect (0.643).

7.17.4 Interpretation for CSF3 – Right first time:

$$\begin{aligned} \text{Eta squared for CSF3} &= \frac{-2.971^2}{-2.971^2 + (60 + 60 - 2)} \\ \text{Eta squared for CSF3} &= 0.070 \end{aligned}$$

An independent samples t-test was used to compare the ‘right first time’ critical success factor scores for discrete verses framework projects. There was a significant difference in scores for discrete projects ($M=0.123$, $SD=0.098$) and framework projects ($M=0.170$, $SD=0.072$), $t(118) = -2.971$, $p=0.004$. The magnitude of the differences in the means was moderate (0.070).

7.17.5 Interpretation for CSF4 – Health and safety inspections:

$$\begin{aligned} \text{Eta squared for CSF4} &= \frac{-4.277^2}{-4.277^2 + (60 + 60 - 2)} \\ \text{Eta squared for CSF4} &= 0.134 \end{aligned}$$

An independent samples t-test was used to compare the ‘health and safety inspection’ critical success factor scores for discrete verses framework projects. There was a

difference in scores for discrete projects ($M=0.159$, $SD=0.045$) and framework projects ($M=0.189$, $SD=0.033$), $t(118) = -4.277$, $p=0.000$). The magnitude of the differences in the means was large (0.134).

7.17.6 Interpretation for PS index – Project Success Index:

$$\begin{array}{lcl} \text{Eta squared for PSI} = & & -10.147^2 \\ & \frac{}{-10.147^2 + (60 + 60 - 2)} & \\ \text{Eta squared for PSI} = & & 0.466 \end{array}$$

An independent samples t-test was used to compare the ‘project success index’ factor scores for discrete verses framework projects. There was a significant difference in scores for discrete projects ($M=0.677$, $SD=0.149$) and framework projects ($M=0.908$, $SD=0.094$), $t(118) = -10.147$, $p=0.000$). The magnitude of the differences in the means was large (0.466).

7.18 Discussion of empirical results from the t-test analysis

Use of independent samples t-tests for analysis suits the project data well because discrete and framework projects are treated as two different groups undertaken within different conditions. The predominant condition difference between groups is due to performance measurement through an incentive system offered by the framework agreement. Stage One involves inclusion of all projects included within the case study representing a four year period of data collection. In order to examine the effect of project size upon the results, a secondary analysis was applied. The closest financially matched 60 paired projects were subjected to additional independent t-tests at Stage Two. A summary for both test results is shown in Table 7.15

Table 7.15: Summary of t-test results

Variable/factor	Stage 1 results			Stage 2 results		
	p Value	Eta Test result	Magnitude of difference	p value	Eta Test result	Magnitude of difference
CSF1A – starting on time	0.278	0.007	Very small	0.173	0.016	Small
CSF1B – finishing on time	0.034	0.027	Small to moderate	0.019	0.046	Moderate
CSF2 – Accuracy of payments	0.000	0.709	Large	0.000	0.643	Large
CSF3 – right first time	0.000	0.095	Moderate to large	0.004	0.070	Moderate
CSF4 – Health and safety	0.000	0.090	Moderate to large	0.000	0.134	Large
PS – Project Success Index	0.000	0.454	Large	0.000	0.466	Large

A significant advantage of the available data contained within this case study is access to detailed project outcomes and critical success factors supporting these outcomes. A concern with quality of data voiced by Molenaar and Songer (1998) is not relevant due to free access with contractual and operational records for each project.

Recent research exploring the effect project characteristics has upon performance of projects been used to determine how analysis should be undertaken. Use of findings by Favie and Maas (2008) positioned a top ten list of characteristics that identified only one variable which may cause effect to performance outcomes from the case study data. This significant variable could only be through contract value as all other characteristics aligned well.

P values and Eta test results in Table 7.15 indicate marginal differences in the magnitude of means between the two stages. A conclusion from this analysis is that

contract value does not make a significant difference in project outcomes or critical success factors for case study projects. Extension of this conclusion is that data from all case study projects is reliable and represents a statistically close group.

7.19 Summary

A review of outcomes classified as raw data in this thesis indicated that case study discrete projects achieved performance levels broadly comparable with industry norms. Although this review compares data from projects that had dissimilar characteristics from the case study ones, the comparison provides confidence of a general view. Use of comparable statistics from *Agile Construction* and *BEDC Office Buildings* included in Table 7.5 indicates that the case study experience of performance with discrete projects was not unlike those experienced by other client organisations. Outcome with defects (BEDC 46% verses discrete 38%) and finishing late (Agile 70% verses discrete 88%) is as expected.

The raw data contrast between case study discrete and framework project is significant at headline analysis encouraging further investigation at a detailed statistical level. A series of explorations regarding relationships is undertaken to determine if bias is detected with results or if influences are present within the dataset which would not be considered normal. Scatterplot diagrams 7.1 to 7.6 confirm purity of data with anticipated industry norms.

A series of critical success factors aggregated to a project success index suggested by Yeung, *et al* (2008) has been adopted for use by this research from seven CSF's identified in Hong Kong building projects. Five CSF's calculated from organisation priorities – although specific to this research - use similar criteria and weightings to those proposed by Yeung. The five CSF's and relationship with PSI are defined in detail allowing group statistics to be produced for all projects. A graphical representation of mean results is shown in Figure 7.7.

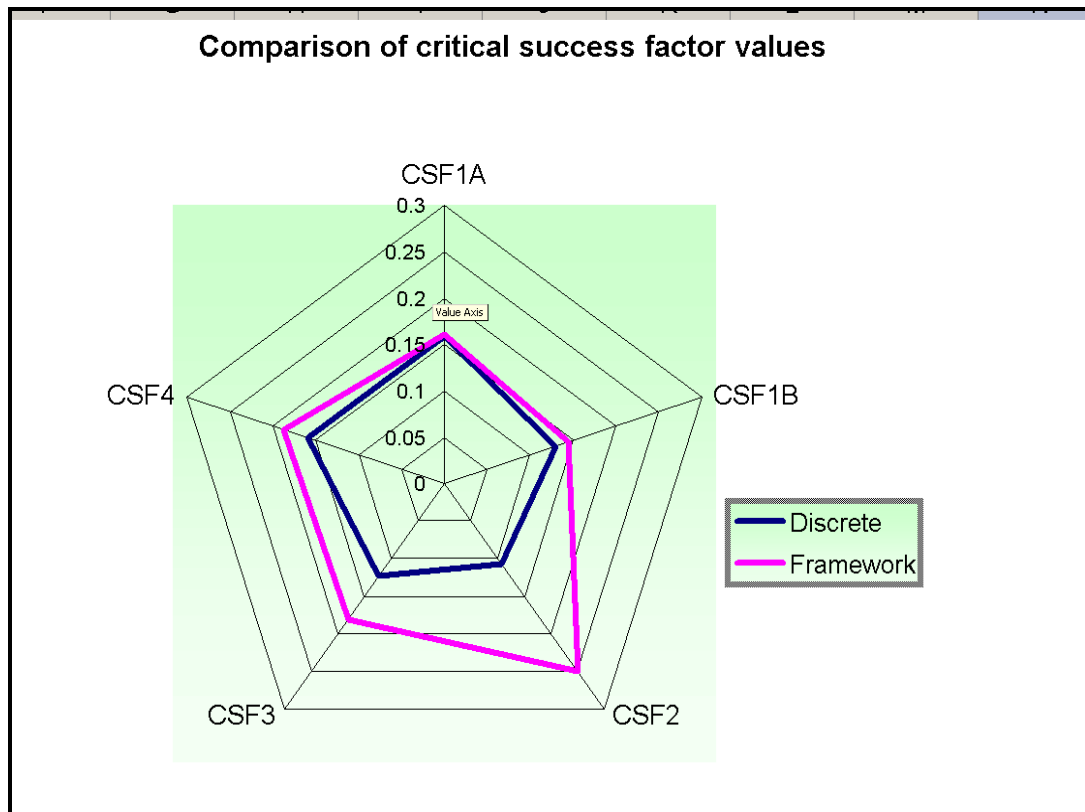


Figure 7.7: Radar diagram showing the comparison of CSF values between all discrete and framework projects within this case study

Discrete CSF values in Figure 7.7 display qualities which mirror outcomes for traditional procurement, although actual values are specific to this research. Higher values represent higher levels of performance where maximum values reach weightings in Table 7.8. Performances of CSF outcomes for framework projects are also shown in Figure 7.7. There is no comparable published literature for framework projects with which to compare, but the values show a difference in performance with those of discrete projects. For CSF2, CSF3 and CSF4, these differences are significant. As the values for stage 2 results are so close, a radar diagram has not been produced because this does not show any discernable difference.

Examination of two hypotheses proposed by chapter four is analysed from the evidence gathered and conclusions reached:

H1: Operational methods of framework agreements can significantly improve out turn performance of construction projects in respect of timescales, payments, defects and safety.

H₁ proposes that operational use of framework agreements, with focus upon recording key project performance outcomes, coupled with incentives through a performance model will improve performance of critical success factors in a construction project. Recognition of five critical success factors developed from published research is:

CSF1A – starting on time – p value = > 0.05

CSF1B – finishing on time - p value = < 0.05

CSF2 – accuracy of payments - p value = < 0.05

CSF3 – right first time - p value = < 0.05

CSF4 – Health and safety - p value = < 0.05

Although specific to this case study, the five CSF's are an extension of the iron triangle proposed by Atkinson (1999). To this end .33 is weighted toward timescales (CSF1A and 1B), .27 toward finance (CSF2) and .4 toward quality (CSF3 and 4). Simplistic statistical outcomes shown at Table 7.5 indicated a significant difference in favour of framework agreement projects for improvement in timescales (CSF1A and CSF1B) but independent t-tests for CSF1A indicates a small magnitude of difference and CSF1B a small to moderate/moderate difference of the means. This variance is due to the way results are calculated. Table 7.5 represents the number of late projects irrespective of extent whereas CSF1A and 1B registers the extent of variance in timescale relative to project duration. On this basis at a headline level, framework projects within the case study perform significantly better than discrete projects. When the project duration is added into the equation results between discrete and framework projects show a small to moderate difference between the groups.

Accuracy of payments (CSF2) shows a consistent variance at both Stages using t-test outcomes. CSF3 (right first time) results are consistent with favour toward framework projects which supports simplistic outcomes in Table 7.5. Health and safety outcomes (CSF4) show a significant improvement in performance with framework projects.

In summary, all CSF results show a positive bias toward improved performance with framework projects ranging from very small to large. The magnitude of difference varies according to the CSF itself and the method of measurement and calculation. Whilst CSF1A supports a null hypothesis, CSF1B, CSF2, CSF3 and CSF4 with p values not exceeding 0.05 do support the proposition of H₁.

H2: Framework agreements can provide significant performance improvements compared with traditional discrete tendering methods in terms of overall project outcomes.

H2 proposes that overall project outcomes from use of framework agreements will produce significant improvements with performance. The proposition relies upon calculation of a project success index from aggregation of critical success factors determined by a client. If a project fulfils complete satisfaction in terms of all critical success factors the maximum value assigned will be 1.0. Graphical representation of the effect of framework verses discrete projects is shown in Figure 7.7, where increased surface area contained within boundaries is proportional to increased performance.

Group statistics results show an increase in overall project performance from .677 to .924 (stage one all projects), and from .677 to .908 (stage two matched projects) by moving from traditional discrete to framework systems. Analysis using independent t-tests and Eta results indicate that the magnitude of difference is large.

Overall project outcomes represented by PSI for both stages produce p values not exceeding 0.05 and therefore support the proposition of H2.

CHAPTER 8: FINANCIAL VIABILITY OF FRAMEWORKS AND PERCEPTION OF VALUE OF FRAMEWORKS WITHIN PROFESSIONAL PRACTICE

8.1 Introduction and background

In this chapter, financial performance of construction frameworks is examined within contextual positioning related to data collected through the case study projects. A standard procedure is used (Flanagan *et al*, 2007) comprising:

- Identification of financial performance indicators
- Collection of base data related to the indicators
- Calculation of a financial performance index

The traditional perspective for measurement of financial performance with construction projects is often judged by comparing the price of an accepted tender and final account outcome of construction project costs (Nguyen *et al*, 2004). It is suggested that this however does not reflect true financial performance during the engagement and construction process because costs vary according to contextual placement along the project life cycle. Budgetary values for a project flex during project development as client demands and design solutions change. Most projects are financially reviewed during four milestones of development – feasibility, detailed design, tender and final account (European Expert Group 2010, p 22). Between each milestone, a client will permit variations to a budget according to the need to add or omit elements to a project.

Uses of simple comparison between tender and final account values are not reliable indicators of financial performance because these do not highlight permitted variations with budgets. For example, a significant increase in budget value could be due to client instructions regarding increased capacity with the project – the project has been completed to client requirements and to the revised financial allowance, but there is a significant statistical variation between tender and completion values. Therefore this research assesses financial performance by comparison of values at the most significant period of budgetary commitment within a project life cycle,

namely a detailed examination of projects at tender stage using tender values. This reflects the single most important decision of financial commitment during a project's life span by a client, as significant costs are committed once a tender has been accepted. As substantial access has been granted regarding financial information for projects contained within this case study, an opportunity is taken to collate data from costs that are normally difficult to obtain due to confidentiality and varying/different standards of record keeping (Chang and Ive, 2001).

Economic theory discussed in chapter three recognised actions of a perfect market in construction tendering, with operation of framework agreements as a potential barrier to operation of this mechanism. Such theoretical discussions have not escaped the attention of practitioners (Morgan, 2009). In order to explore financial performance of framework projects with those engaged through traditional discrete methods, three distinct areas of cost research are chosen for examination. Clients incur costs of procurement, tendering, engagement and supervision in addition to those arising from payments made to a supplier through the construction contract. Analyses of projects contained within this case study provide three defined areas with which to dissect distinct cost information:

- Engagement **transaction** costs. These include the cost of production of feasibility and conceptual designs, detailed design and the production of tender documents.
- Performance monitoring **transaction** costs. These reflect resources used to supervise and manage the construction phase of a project including those required to collate performance measurement data.
- Construction project **production** costs. These are costs of engagement of the construction work supply chain and for this research specifically refer to accepted tender values. Concentration upon tender rather than final account value allows a purity of cost data to be captured under similar tender conditions enabling comparable benchmarks between the two procurement systems.

Statistical analysis between discrete and framework projects is explored through use of independent t-tests with results subjected to Levene's test to measure magnitude

of variances between the groups. Results from empirical evidence obtained through these methods is matched against hypothesis H3, hypothesis H4 and hypothesis H5 allowing a summary to be made at the end of this chapter.

8.2 Published research regarding transaction costs of projects

A lack of published transaction cost information available to the construction industry was a concern voiced by Hillebrandt and Hughes (2000), who concluded that *'there is very little information either on the costs of different methods of procurement or the benefits derived from them'*. Further research attempting to calculate transaction costs between different procurement methods stated that *'One of the major conclusions of the research, based on a survey of bidding costs, is that there is no evidence that simply the presence or absence of collaboration affects tendering costs'* (Hughes, *et al*, 2006, Executive Summary page x). On the supply side, a survey from contractors reported that 49% of respondents (n = 358) found difficulties with framework prequalification processes with an average cost of £1360 being spent in pre-qualification (NFB, 2010). Concern with the high costs of transaction and engagement of suppliers formed the predominant conclusion of the NFB report but this was voiced at public sector clients generally rather than allied to a specific procurement system.

8.3 Central government views and professional practice on production costs of projects

Current views from UK government regarding production costs are provided through the *Government Construction Strategy* (Cabinet Office, 2011), with particular reference toward frameworks being highlighted by specific mention:

Paragraph 1.6 states *'.....clients and suppliers need to work together on a shared improvement plan, and that this means working with fewer suppliers in a more settled supplied chain. This has generally been achieved by the creation of frameworks, tendered in accordance with the requirements of public procurement law – which then stay in place for a fixed period (of up to 4 years).'* Paragraph 1.7 continues *'The principles behind this remain valid, but there is a tension between the benefits of working with fewer suppliers in long-term relationships, the desire to*

maintain a market that is accessible to new entrants (particularly Small Medium Enterprises) and the risk of locking out competition and innovation...' In summary, the report recognises evidence from clients and contractors of the '*highly effective use of frameworks, but also to other frameworks which are less effective*' (paragraph 2.38). Reaction from professionals to the *Government Construction Strategy* has been positive, with statements released by members of the Construction Industry Council on 9 June 2011 (CIC, 2011) as follows:

"The RIBA welcomes the Government's new Construction Strategy, which presents a genuine opportunity for the construction industry to take a joined up approach and work towards achieving important efficiencies together"....RIBA President Ruth Reed.

"The Strategy set out by the Government should have a big impact on the industry's ability to deliver public projects effectively and efficiently"...CIOB Chief Executive Chris Blythe.

"The new Construction Strategy represents an excellent opportunity for the Government and the industry to work together to ensure value for money across public construction and infrastructure projects"....RICS Director of Practice Gary Strong.

However the strategy needs to set against a background of increasing economic austerity and financial pressure from clients. Results from a survey undertaken by the Royal Institution of Chartered Surveyors (RICS, 2011b) of 392 quantity surveyors revealed that 64% of responses advised a client not to accept a tender because it was considered to be too low to be viable. Despite an emphasis upon collaborative working throughout the construction industry, there is once again strong financial pressure upon clients to accept low value tenders.

8.4 Comparison of transaction and production costs between discrete and framework agreements – source and standard of base data

As access has been given by the client organisation to detailed costs that are normally difficult to obtain, an examination is made through this case study of transaction and production costs to detect if a difference exists between discrete and framework agreement projects. Respectful of the difficulties prevalent in such data highlighted through published research, the following standards are applied to provide reliability for all projects contained in this case study:

1 All fees for transaction costs are benchmarked against a standard cost base. Within the organisations' internal accounting system resources are costed using timesheet apportionment and valued at hourly rates. As a 'pseudo trading' situation exists between departments, all costs are allocated against capital projects and these costs are verified through the extensive and transparent financial systems employed by the authority. Time sheet input is vetted on a monthly basis by project managers and supervisors. The accuracy and transparency of recording methods used by the case study provides complete contrast to earlier research on transaction costs where no reliable time sheet information could be found to support data (Hughes *et al*, 2006, page 47).

2 Variance between production costs is established through a difference between the quantity surveyors' pre tender estimate and the accepted tender for a project. This method of comparison acknowledges the difficulty of benchmarking civil engineering construction projects. Unlike elemental cost planning techniques used for building projects, civil engineering costs do not readily relate to a single unit of measurement such as cost per square metre of internal gross floor area (RICS, 2012). It is therefore proposed that a standard form of entity cost analysis is used by calculating pre-tender estimates from principle components (Martin, 2012). Standard rates are applied to estimated quantities of components. This resolves the variability of components between projects because the benchmarking process involves application of rate rather than quantity. Guidance provided by Standard Form of Civil Engineering Cost Analysis (BCIS, 2011) provides application of this method:

- The pre-tender estimate is compiled from components relevant and representative of civil engineering projects of the type included within the

case study. Verification of this statement is provided through use of a database by the quantity surveyor that aligns with tender prices produced from the Road Construction Tender Price Index (RCTPI) issued by Building Cost Information Service regulated by RICS.

- The pre-tender estimate is a genuine attempt to calculate market value of the project representative of the technical class.

The accepted tender is checked to ensure conformation to standing orders and financial regulations set by the public sector organisation as a bona fide tender. This requires analysis of individual prices for predicted norms. Inference of the variation between estimated and actual production costs is used to detect if a change in procurement method is reflected by the difference between anticipated tender values and actual tender values. This variance is used to determine if a procurement method affects anticipated value and thus tender prices.

8.5 Analysis of engagement and performance monitoring transaction costs

An attempt to discover the financial effects of engagement transaction costs for projects included within this case study uses investigation of records from the organisations' SAP accountancy system (appendix 16). Costs for fees charged to each project have been collated for two groups of projects that are matched closely for size according to contract value: 60 discrete projects of a total value of £30,431,702.52 (mean = £507,195.04) and 60 framework projects of a total value of £16,403,695.97 (mean = £273,394.93). Engagement transaction costs for all 120 projects are abstracted from costs reports for each project, an example of which is shown in Appendix 17. The project group activity staff report represents resources spent on various activities together with a cost for each and forms raw data for analysis of hypothesis H4:

H4: There is no significant difference between engagement transaction costs of framework agreements and traditional tendering methods.

Within this hypothesis, the term 'engagement transaction' refers to the following costs:

- Feasibility – production of the early conceptual designs for a project.
- Preliminary work – engagement with stakeholders and effect on local environment.
- Investigation – geotechnical surveys, desk surveys and examination of physical properties.
- Detailed design – producing detailed specification and construction drawings.
- Tender preparation – pricing documents such as contract information and bills of quantities.

Information from the SAP accountancy system is also used for analysis of hypothesis H₅ but related to performance monitoring:

H₅: There is no significant difference between performance monitoring transaction costs of framework agreements and traditional tendering methods

For hypothesis H₅, the term ‘performance monitoring transaction’ refers to the following costs:

- Site supervision – overall costs of checking the work is to standards required, issuing variations on site and conducting the management of the project as defined by the contract.
- Measurement – agreement and valuation of the work including compensation events and providing financial duties required by the contract and organisation standing orders.
- Project management – overall management of the project as defined by the contract and organisation standing orders including liaison with stakeholders and elected Members.

8.6 Definitions and basis of calculations for engagement and performance monitoring transaction costs used in this research

For financial assessment of the 120 selected case study projects the following definitions, sources of data and calculations are used within the construct:

Tender total

The value of a tender submitted by a supplier, checked and corrected for arithmetic errors by a quantity surveyor and included within the organisations tender report.

Feasibility, preliminary work, investigation, detailed design and tender preparation costs

The total value of each cost collected from the organisation's SAP accounting system.

Total procurement costs

The aggregation of each cost stated above.

Engagement transaction cost quotient

The value of total procurement costs divided by a lowest tender submitted by a supplier, checked and corrected for arithmetic errors by a quantity surveyor and included in the organisations tender report.

Site supervision, measurement and project management costs

The total value of each cost collected from the organisation's SAP accounting system.

Total post contract costs

The aggregation of each cost stated above.

Project monitoring transaction cost quotient

The value of total post contract costs divided by a lowest tender submitted by a supplier, checked and corrected for arithmetic errors by a quantity surveyor and included in the organisations tender report.

Total fee percentage quotient

Aggregated value of an 'engagement transaction cost quotient' and 'performance monitoring transaction cost quotient'.

Actual values, project details and calculations are shown in Appendix 17.

8.7 Analysis of results for financial engagement and performance monitoring transaction costs

Results from collation of financial transaction values have been separated into two groups of data – one for procurement that relates to engagement transaction costs and the other for performance monitoring costs. An aggregated value is obtained for the total fee for a project related to the total fee percentage quotient but analysis between the two groups is separated. Within the two groups, variance factors for the different costs are independent variables that support cost quotients (dependent variables). A statistical method of independent t-tests is used to explore relationships with costs for each of the two groups.

8.8 Empirical analysis for engagement and performance monitoring transaction costs

A check for reliability of scales for classification of raw data (financial values) and the use of cost quotients form the underlying statistical construct. Both engagement and performance monitoring transaction costs are checked for internal consistency using Cronbach's alpha coefficient. Results from this analysis are shown in Table 8.1.

Table 8.1: Reliability statistics for transaction costs

Cronbach's Alpha	N of Items
.890	3

Examination of Cronbach's alpha values for individual sections reveals a range of scores from 0.748 to 0.905. Therefore scales used for all sections of analysis can be considered reliable.

A graphical representation is used to identify frequencies, distribution and profiles of aggregated values for total fee quotients – representing total values of engagement and performance monitoring transaction costs set against tender values. A histogram of quotients for discrete projects is shown at Figure 8.1, with framework projects shown at Figure 8.2. Visual interpretation reveals similar distribution curves for both groups – but with a wider range of values for discrete when contrasted with

framework projects. This suggests that transaction costs for discrete projects are more volatile than with framework projects included within this study.

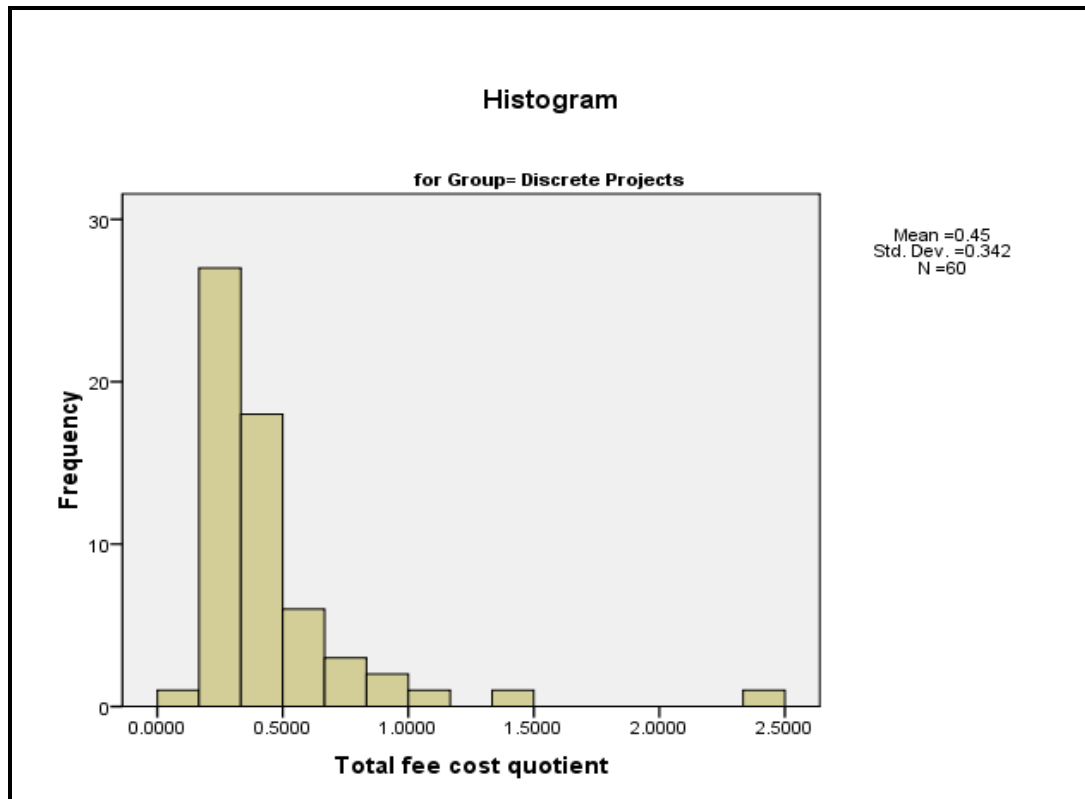


Figure 8.1: Histogram of total fee quotient for discrete projects

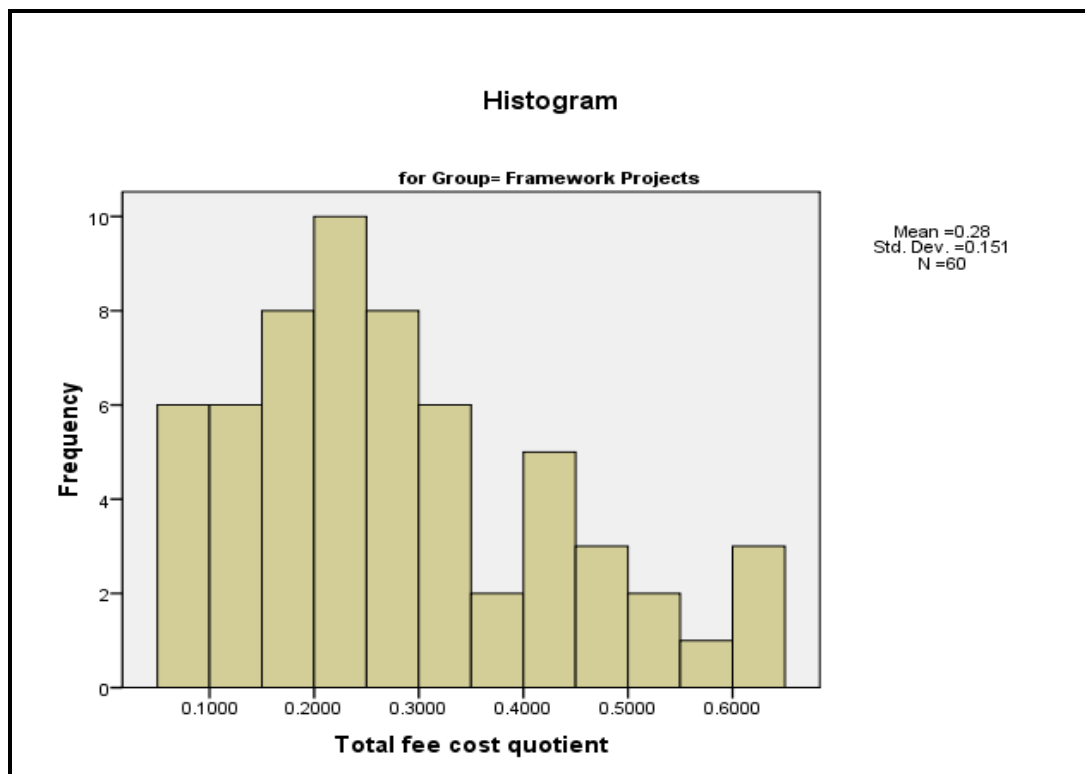


Figure 8.2: Histogram of total fee quotient for framework projects

In order to statistically explore relationships between the two groups further, independent samples t-tests are applied to quotient values from the data sheet. The purpose of the t-tests is to compare mean scores with groups to determine, using empirical investigation, if the proposals made by hypothesis H₄ and H₅ are justified. A Microsoft Excel data file representing projects in Appendix 17 was transferred into Statistical Package for the Social Sciences (SPSS) version 20.0 following a check for arithmetic means and missing values. Results of analyses are shown in Tables 8.2 and 8.3.

Table 8.2: Group statistics for transaction cost quotients

Group		N	Mean	Std. Deviation	Std. Error Mean
Engagement transaction cost quotient	Discrete Projects	60	.2236	.1605	.0207
	Framework Projects	60	.1106	.0694	.0089
Performance monitoring transaction cost quotient	Discrete Projects	60	.2236	.2130	.0274
	Framework Projects	60	.1656	.1115	.0143
Total transaction cost quotient	Discrete Projects	60	.4472	.3415	.0441
	Framework Projects	60	.2763	.1508	.0194

Table 8.3: Independent samples t-test results for transaction cost quotients

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2- tailed)	Mean Diff	Std. Error Diff	95% Confidence Interval of the Difference	
									Lower	Upper
Engagement transaction cost quotient	Equal variances assumed	9.470	.003	5.000	118	.000	.1129	.0225	.0682	.1576
	Equal variances not assumed			5.000	80.34	.000	.1129	.0225	.0679	.1578
Performance monitoring transaction cost quotient	Equal variances assumed	1.331	.251	1.869	118	.064	.0580	.0310	-.0034	.1194
	Equal variances not assumed			1.869	89.08	.065	.0580	.0310	-.0036	.1197
Total transaction cost quotient	Equal variances assumed	4.490	.036	3.547	118	.001	.1709	.0482	.0755	.2664
	Equal variances not assumed			3.547	81.16	.001	.1709	.0482	.0750	.2668

8.9 Interpretation of transaction cost results from independent samples t-tests

Levene's test (Levene, 1960) for equality is used to determine whether the same variance of scores occur for both groups. The relevant t-test value (equal variances assumed or equal variances not assumed) is used to calculate effect size to provide an indication of the magnitude of difference between the groups. For all independent t-tests, an Eta squared formula is used to determine effect size with values between 0

and 1 to represent the proportion of variance in the dependant variable compared with the independent group variable. The formula is:

$$\text{Eta squared} = \frac{t^2}{t^2 + (N1 + N2 - 2)}$$

Cohen (1998) proposes guidelines for interpretation of the Eta squared values. These are: 0.01=Small differences, 0.06=Moderate difference, 0.14=Large difference.

8.9.1 Interpretation of variance of engagement transaction cost quotient

$$\begin{aligned} \text{Eta squared for variance} &= \frac{5.000^2}{5.000^2 + (60 + 60 - 2)} \\ \text{Eta squared for variance} &= 0.174 \end{aligned}$$

An independent t-test was used to compare engagement transaction costs for discrete verses framework projects. There was a significant difference in scores for discrete projects ($M=0.224$, $SD=0.161$) and framework projects ($M=0.111$, $SD=0.069$), $t(118) = 5.000$, $p=0.000$). The magnitude of the differences in the means was large (0.174).

8.9.2 Interpretation of variance of performance monitoring transaction cost quotient

$$\begin{aligned} \text{Eta squared for variance} &= \frac{1.869^2}{1.869^2 + (60 + 60 - 2)} \\ \text{Eta squared for variance} &= 0.029 \end{aligned}$$

An independent t-test was used to compare performance monitoring transaction costs for discrete verses framework projects. There was no significant difference in scores for discrete projects ($M=0.224$, $SD=0.213$) and framework projects

($M=0.166$, $SD=0.112$), $t(118) = 1.869$, $p=0.064$). The magnitude of the differences in the means was small (0.029).

8.9.3 Interpretation of variance of total transaction cost quotient

$$\begin{aligned} \text{Eta squared for variance} &= \frac{3.547^2}{3.547^2 + (60 + 60 - 2)} \\ \text{Eta squared for variance} &= 0.096 \end{aligned}$$

An independent *t*-test was used to compare the total transaction costs for discrete verses framework projects. There was a significant difference in scores for discrete projects ($M=0.447$, $SD=0.342$) and framework projects ($M=0.276$, $SD=0.151$), $t(118) = 3.547$, $p=0.001$. The magnitude of the differences in the means was moderate to large (0.096).

8.10 Summary of analysis of transaction costs

Separation of transaction costs between engagement and monitoring allow conclusions for each to be reached. Reflection of hypothesis H4 related to engagement transaction costs proposed that no significant difference would be detected. A theoretical basis supporting this proposition was arrived through reference to analysis of tendering methods between engagement transaction costs of framework agreements and traditional approaches (Murdoch and Hughes, 2008). The reasoning, following examination of published literature, was that for public sector procurement engagement either method would require the same stages of document production and control – ergo, incurring similar costs for both methods.

The large magnitude of difference in the means (0.174) is surprising and is supported by the mean difference in engagement cost quotient (0.2236 – 0.1106). Framework methods in this case study have proportionally lower costs per project for engagement when compared with discrete methods. There is no directly published research concerning engagement costs for framework agreements (Hughes *et al*, 2006) but a comment from a participant may suggest why framework agreement

costs could be lower than for traditional projects. A quantity surveyor (SG) stated *'The mechanisms in the framework allow efficient tendering due to standardisationand to my mind that's just incredibly efficient.* Causation of such results may be therefore due to standardisation of procedures and documentation arising through application of framework control systems.

Hypothesis H₅ proposed that no significant difference between performance monitoring transaction costs would be detected between the two different engagement methods. The theoretical basis of this assumption is through analysis with studies undertaken into costs of quality experienced by the industry. Crosby (1979) asserted that *'quality is free'* whilst Abdelsalam and Gad, (2009) revealed that cost of quality to suppliers is around 2% of project value. Supervision of such outcomes should therefore be negligible and the hypothesis followed this basis.

Results from the magnitude of the difference of means with performance monitoring costs is small (0.029) supported by a mean difference in monitoring cost quotient (0.2236 – 0.1656) indicating that although collection of key performance indicators is required for a selection procedure within a framework agreement; this is no more financially demanding than those required by discrete projects. Correlation with the proposition of Hypothesis H₅ is matched.

8.11 Economic effects of limited competition through frameworks

A significant question from practitioners and clients alike that concern use of frameworks is that of competition between suppliers. Economic theory regarding effects of supply and demand is well established (Locke, 1691) and dictates that operation of a perfect market produces the lowest tender price; ergo restriction of such a market should result in higher tender levels. Some practitioners extend this economic argument and claim that framework agreements act as an artificial restriction to open markets and result in higher prices. Morgan (2009) stated this with his views upon restrictive competition and innovation. Similar concerns have been voiced through the Government Construction Strategy (Cabinet Office, 2011) where projects placed through a framework should be tested by application of a cost benchmarking process. Application of a suitable benchmark used for testing has not been specified, but the strategy suggests that any framework project which fails a benchmarking test in terms of value for money is removed from the framework and

subjected to open competition. This research uses a benchmarking process to examine production costs against estimated costs for all projects within the case study. The economic effect argument provides a basis for hypothesis H₃:

H₃: There is significant difference in production costs between framework agreements and traditional tendering methods due to reduced competition.

Within this hypothesis, the definition ‘production cost’ refers to a tender price that is accepted by the client for an individual project. Due to variations with the financial assessment of construction projects it is suggested that this absolute value – specific at a particular milestone within the life cycle of a project – provides a benchmark that is comparable with all projects and is recognised by the industry. This benchmark is also endorsed through the Government Construction Strategy (Cabinet Office, 2011). Due to project characteristics, comparison between production costs of different tendering methods for the same project is extremely difficult to obtain because this would involve tendering the same project on multiple occasions – a position unacceptable to both client and supplier due to extensive costs involved. Instead hypothesis H₃ will be tested using a method of value assessment familiar to clients and supported by public sector procurement regulations. The case study client organisation is required to gain approval for construction projects by operation of standing orders which include preparing a pre-tender estimate of production costs. Prepared by quantity surveyors to reflect current market prices irrespective of discrete or framework procurement method, this estimate provides a benchmark of value. Economic variations in the market are reflected by variance between the pre-tender estimate and accepted tender.

In order to examine the economic effects suggested by hypothesis H₃ two groups of major projects were closely matched for size according to contract value. 60 discrete projects of a total value of £30,431,702.52 (mean = £507,195.04) with 60 framework projects of a total value of £16,403,695.97 (mean = £273,394.93) were selected for analysis. This was deemed a comparable match because minor projects under the framework arrangements (generally less than £21,000.00) do not represent median values. Evidence of the pre-tender estimate and the tender total for a project is provided through a quantity surveyors report (with an example included at Appendix 14). In addition, where a tender other than the lowest is proposed for acceptance due

to an alternative incentive mechanism, this information is also deduced from a tender report.

8.12 Calculation of financial production values in this research

For financial assessment of the 120 selected projects the following definitions, sources of data and calculations are used within the construct:

Tender total

The value of a tender submitted by a supplier, checked and corrected for arithmetic errors by a quantity surveyor and included in the organisations tender report.

Pre-tender estimate

The estimated value of a project at tender stage prepared by a quantity surveyor and included as a value in organisation reports.

Variance between tender total and estimate

The difference between 'tender total' and 'pre-tender estimate' where a = tender value and b = estimate value. If $a/b = < 1$, then the lowest tender is below the estimate. If $a/b = > 1$, then the lowest tender has exceeded the estimate.

Lowest tender total

The value of a lowest tender submitted by a supplier, checked and corrected for arithmetic errors by a quantity surveyor and included in the organisations tender report.

Variance between lowest tender total and accepted tender

A difference between 'lowest tender total' and an accepted tender by a client. This is designed to represent the additional costs with use of financial incentive values. The lowest corrected tender will always be selected with discrete procurement methods but if some suppliers are ahead of others in terms of performance for framework projects, a performance adjustment factor may be applied. The client will accept a slightly higher tender if performance metrics for past projects show good performance. Values for discrete projects will therefore always be 1.000 whereas

those for framework may exceed 1.000. Reference to selected case study projects indicate that on six occasions (out of 60) another tender other than the lowest was recommended for acceptance.

All project details, scores and values are shown in Appendix 15.

8.13 Empirical analysis for production costs

A check for reliability of scales for classification of raw data (financial values) and the use of cost variances form the underlying statistical construct. Production costs are checked for internal consistency using Cronbach's alpha coefficient. Results from this analysis are shown in Table 8.4.

Table 8.4: Reliability statistics for production costs

Cronbach's Alpha	N of Items
.745	3

The result exceeding 0.7 for all sections of analysis can be considered reliable. A graphical representation is used to identify frequencies, distribution and profiles of aggregated values for production costs set against tender values. A histogram of quotients for discrete projects is shown at Figure 8.3, with framework projects shown at Figure 8.4.

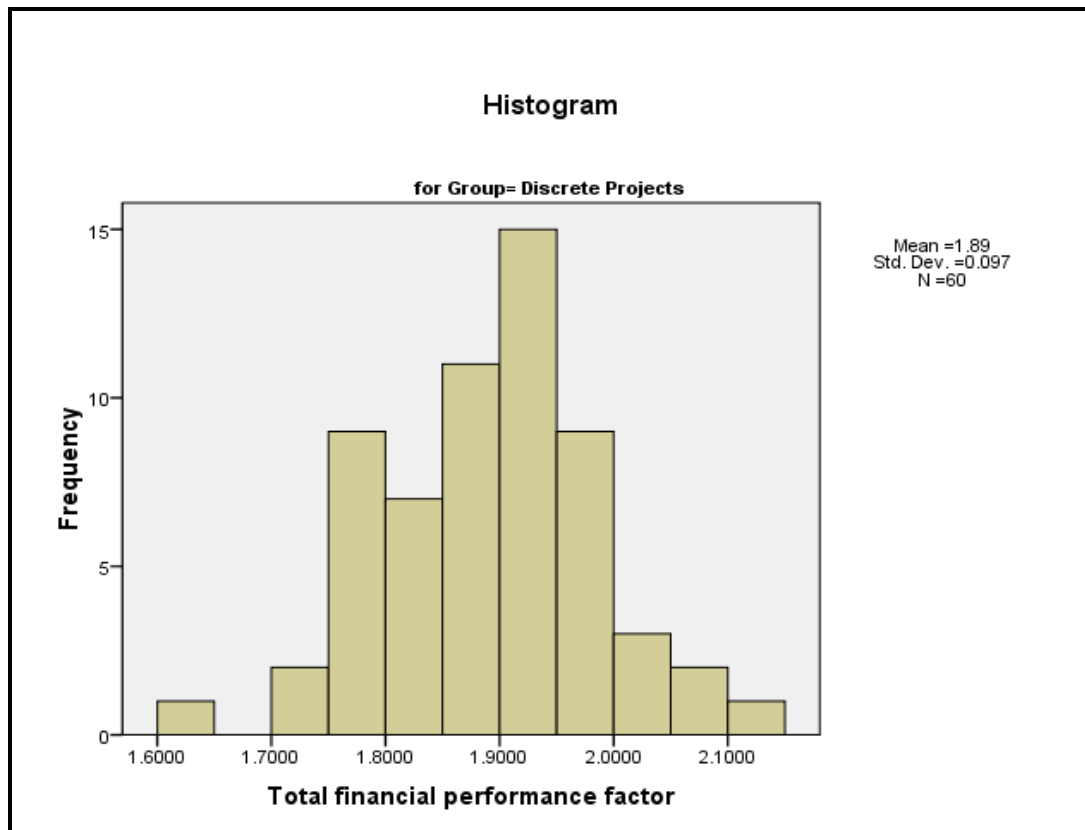


Figure 8.3: Total production factor for discrete projects

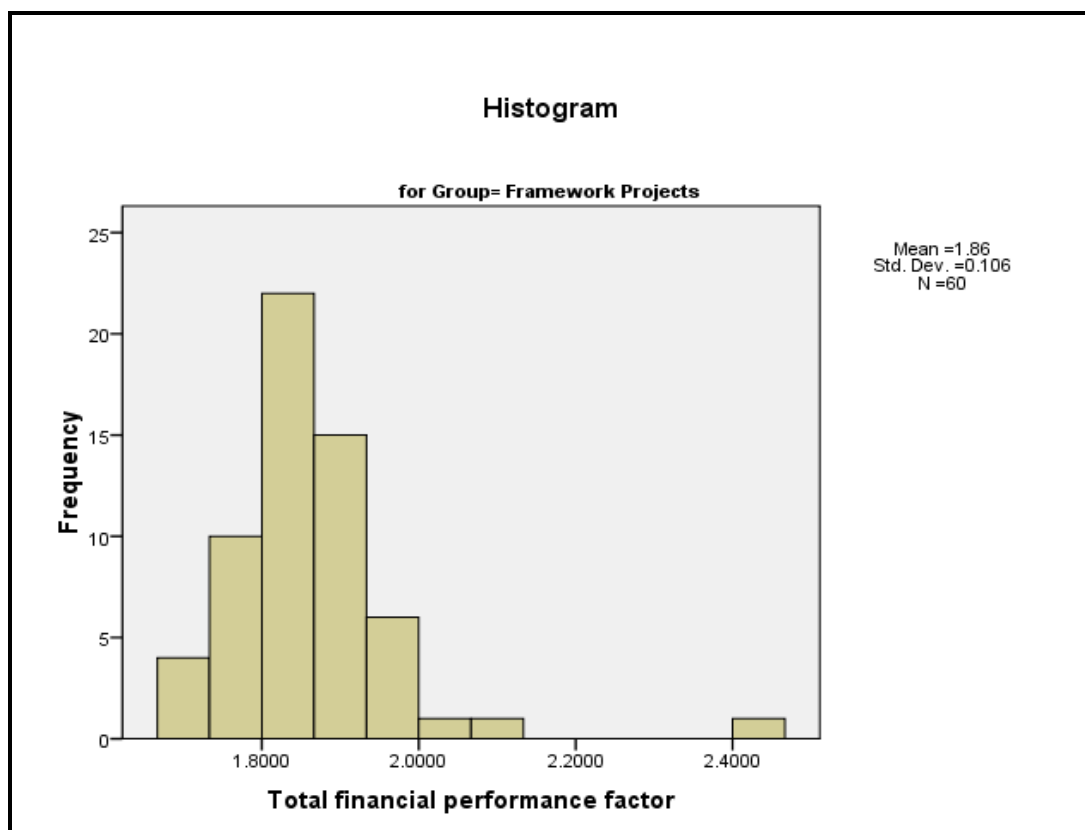


Figure 8.4: Total production factor for framework projects

Visual interpretation reveals similar distribution curves for both groups – but with a wider range of values for discrete when contrasted with framework projects.

8.14 Analysis of results of financial production values

Results from collation of financial production values have been synthesised into two variance factors (independent variables) supporting a total variance (dependent variable). A statistical method of independent t-tests is used to explore the relationships between the two groups. Group statistics are shown in Table 8.5 and results of t-tests in Table 8.6.

Table 8.5: Group statistics for financial production values

Group		N	Mean	Std. Deviation	Std. Error Mean
Variance between estimate and lowest tender	Discrete Projects	60	.887770	.0969033	.0125102
	Framework Projects	60	.857718	.1061245	.0137006
Variance between lowest tender and accepted tender	Discrete Projects	60	1.000000	.0000000	.0000000
	Framework Projects	60	1.002698	.0108235	.0013973

Table 8.6: Independent samples t-test financial production values

		Levene's Test		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Diff	95% Confidence Interval	
									Lower	Upper
Variance estimate and lowest tender	Equal variances assumed	.398	.529	1.620	118	.108	.0300520	.0185529	-.0066878	.0667919
Variance lowest tender and accepted tender	Equal variances not assumed	15.196	.000	-1.931	118	.056	-.0026985	.0013973	-.0054655	.0000686

8.15 Interpretation of group statistics and independent samples t-tests

As described earlier in this chapter, Levene's test for equality is used to determine whether the same variance of scores occur for both groups. The results are subjected to Eta squared value calculations with guidelines for interpretation provided by Cohen (1998).

8.15.1 Interpretation of variance between tender total and estimate

$$\begin{aligned} \text{Eta squared for variance} &= \frac{-1.620^2}{-1.620^2 + (60 + 60 - 2)} \\ \text{Eta squared for variance} &= 0.022 \end{aligned}$$

An independent t-test was used to compare the variance between tender total and estimates for discrete verses framework projects. There was no significant difference in scores for discrete projects ($M=0.888$, $SD=0.097$) and framework projects ($M=0.858$, $SD=0.106$), $t(118) = -1.620$, $p=0.108$. The magnitude of the differences in the means was small (0.022).

8.15.2 Interpretation of variance between lowest and accepted tender

$$\begin{aligned} \text{Eta squared for variance} &= \frac{-1.931^2}{-1.931^2 + (60 + 60 - 2)} \\ \text{Eta squared for variance} &= 0.031 \end{aligned}$$

An independent t-test was used to compare the variance between lowest and accepted tenders for discrete verses framework projects. There was no significant difference in scores for discrete projects ($M=1.000$, $SD=0.000$) and framework projects ($M=1.003$, $SD=0.011$), $t(118) = -1.931$, $p=0.056$. The magnitude of the differences in the means was small (0.031).

8.16 Action research element for financial performance of frameworks

Although it was previously recognised as unrealistic to tender a project twice due to wasted costs for suppliers and a client alike, special permission was granted by the organisation to expose a framework project to wider competition. An action research method was employed to benchmark financial performance of a framework agreement project with a live project. Rather than use framework controls, one project was exposed to market conditions by using traditional discrete selected procedures. In addition to framework suppliers, an experienced contractor with previous knowledge of similar projects was added to the tender list. The external contractor is known to the organisation and has had a historically good record of performance with delivery of similar projects. Tenders were released to suppliers in September 2010 and returned in October 2010. Upon receipt of tenders, an analysis was undertaken by the organisation's quantity surveying section to check the returned bills of quantities for errors and pricing strategies. Although minor errors needed correction, the quantity surveyors analysis revealed no significant concerns with pricing structure or anomalies with anticipated prices against the pre-tender estimate. A summary of the checked and returned tender prices is included at Table 8.7.

Table 8.7: results of submitted tenders for action research project

Tenderer	Tender Sum	Percentage above lowest tender
Framework supplier (Mi)	£439,880.80	-
Framework supplier (Ta)	£494,236.58	12.4
Framework supplier (D and B)	£494,709.00	12.5
Framework supplier (Co)	£513,303.00	16.7
External supplier (Na)	£566,935.78	28.9
Framework supplier (Os)	£575,657.92	30.9
Mean tender price	£514,120.53	16.9

Table 8.7 shows submitted tenders ranked in order lowest to highest in terms of tender sum. Bracketed figures contain tenderers abbreviated supplier names for reference verification.

Results from the report show that framework suppliers gained the first four places in rank, with the external selected supplier coming fifth followed closely by the remaining framework supplier. The tender submitted by the external supplier was 16.9% above the mean of all tenders and 28.9% above the lowest. A detailed examination of individual rates and prices contained in bills of quantities by the quantity surveyor did not reveal any significant variations between the framework tenders and the external supplier, only an overall lower value priced by the former group. One conclusion made from this by the quantity surveyor is that all tenderers priced the action research project on a comparable basis and that all tenders were submitted on a bona fide basis. The relative narrow spread of tender prices indicates a comprehensive understanding of scope and extent of work by tenderers.

Following debriefs with unsuccessful tenderers, including the external supplier, feedback received was that although the successful tender was competitive, no tender was unrealistic or under priced. A particular comment from the external supplier is however noteworthy – *‘although we have known Hampshire County Council for a number of years, clearly the framework suppliers understand what Hampshire requires and have priced accordingly’* (Estimator of Na supplier). As a postscript to

the action research tender, the project was completed to allocated time and within budget despite minor additional works being requested by the client.

8.17 Summary of analysis of production costs

Published evidence of the effect upon increases in tender costs through collaborative practices has not been determined through empirical evidence (Hughes, *et al*, 2006) although the Government Construction Strategy (Cabinet Office, 2011) warns of restrictions to competition through a 'locked out' market. Application of perfect market theory determines that lowest price can only be achieved through open competition. Hypothesis H₃ follows this perfect market theory proposition and by extension would therefore expected results from t-test analysis to indicate a significant difference in variance between pre-tender and tender values between framework agreements and discrete projects. The proposition, anticipates that framework agreements would display a wide variance against pre-tender estimates (higher values) than those for discrete projects.

Two independent measures of variance are used to quantify value of tenders for the discrete and framework projects selected from the case study. Measure one calculated the magnitude of the differences in the means between pre-tender estimate and tender as small (0.022). This indicates that there is no discernable difference between tender pricing levels for discrete and framework projects.

Measure two calculated the magnitude of the differences in the means between lowest tender price and accepted price as small (0.031). This indicates that there is no discernable difference between the lowest price and an occasional higher price accepted by the client due to operation of performance incentives. A deduction from the data indicates that operation of incentive mechanisms has not affected accepted tender price levels.

Confirmation of the conclusion of no overall financial variance is provided through triangulation by another method. Action research was conducted by placing a selected project to a wider list of suppliers than those contained in the frameworks. As a practical element involving live projects this method included a significant risk to the client if the tender strategy did not work. A potential effect could have delayed the project with significant consequences to the organisation and its stakeholders!

Justification of the action method was through use of analytical techniques allied to professional practice – reflecting the nature of a professional doctorate.

Results from the action research project confirm that framework suppliers are competitive when removed from requirements of the framework and a new comparable supplier is introduced. Although the single example is too small to provide empirical evidence that may be extrapolated to a population, the results align within a range anticipated by the t-tests.

8.18 Summation of Hypotheses H3, H4 and H5

This chapter examines the financial viability of frameworks when compared with discrete traditional procurement methods through discovery of transaction and production costs within the case study context. Three hypotheses are proposed following from a literature search and each are restated in this paragraph together with a brief discussion of results.

H3: There is significant difference in production costs between framework agreements and traditional tendering methods due to reduced competition.

General economic theory regarding a perfect market dictates that restriction with the number of suppliers will result in higher production prices (Locke, 1691; Harvey and Jowsey, 2007). Operation of a framework agreement provides a barrier to open competition and hypothesis H3 follows a deductive extension of this proposition. Two measures were used to test this hypothesis and the results are contained within paragraph 8.17. There is no significant difference between outcomes for framework or discrete projects – and a single action research project confirms the values. Hypothesis H3 is therefore rejected but explanation of why perfect market theory does not appear applicable is through statements made by experienced participants in the qualitative interviews (see Chapter 11, paragraph 11.3). One supplier states that frameworks are competitive because *....you've got this continuous programming, planning, arrangement and working on both sides effects is a good environment to achieve that* (supplier 08 SJ). Another states *'clearly the framework suppliers understand what Hampshire requires and have priced accordingly'* (Estimator of Na

supplier). A close and longer term relationship between participants is considered to negate any increase in tender prices due to reduced competition.

H4: There is no significant difference between engagement transaction costs of framework agreements and traditional tendering methods.

H5: There is no significant difference between performance monitoring transaction costs of framework agreements and traditional tendering methods

Both hypotheses are considered together as each arises from similar contextual positions. Although Hillebrandt and Hughes (2000) concluded that '*there is very little information either on the costs of different methods of procurement or the benefits derived from them,*' other studies into performance monitoring either felt that such costs were marginal or difficult to quantify as a separate entity. The *Government Construction Strategy* (Cabinet Office, 2011) recognised both effective and ineffective arrangements and Hypotheses H4 and H5 therefore took a neutral stance. Results of hypothesis H5 followed the proposition suggested by the limited published literature but H4 indicates that engagement transaction costs with the case study framework arrangements are more effective than with discrete projects. The use of standardisation procedures and documentation arising through application of framework control systems is an area stated by participants in the qualitative interviews (see Chapter 10, paragraph 10.8.2 regarding mechanisms), for causation of such efficiencies.

CHAPTER 9: BEHAVIORAL AWARENESS: DETECTION OF QUALITATIVE AND QUANTITATIVE FINDINGS UPON PERFORMANCE

9.1 Introduction: Purpose of qualitative and quantitative research into participants views

Construction is a humanistic organisational group activity and use of a case study method provides an opportunity to gain knowledge from views of experienced practitioners immersed within a framework agreement. Three beneficial outcomes are achieved by use of such data:

- Mintzberg (1979) noted that *‘we uncover all kinds of relationships in our hard data, but it is only through the use of this soft data that we are able to explain them’*.
- Collection of data through tacit knowledge provides a commonality engagement for practitioners fulfilling the professional context of this study.
- Comparisons of secondary data (qualitative views) with primary data (project outcomes) allow conclusions to be formed and reinforced through the triangulation paradigm.

Practitioners generally conform to a theory of ‘group cohesiveness,’ defined by Festinger, Schachter and Back (1950) and demonstrated through professional allegiance aligned with member community and group standards. Construction projects rely upon unrelated individuals coming together for mutual goal objectives and these follow general principles for social cohesion/interpersonal interdependence suggested by Hogg (1992). Practitioners align with a technical/social class determined by codes of conduct, professional standards and technological language (Oakley, 1994) with capture of views via a questionnaire being an appropriate tenet of this research. In order to engage with participants, the questionnaire is written to a technical language assuming a level of technical competence, experience and knowledge relevant to the research subject.

An initial examination of the raw questionnaire data allowed establishment of key views from participants to be discovered. Views from 100 construction management professionals are discovered through use of measures of central tenancy and factor analysis to identify group norms (Tabachnick & Fidell, 2001).

9.2 Questionnaire construction

For this research, a questionnaire is used to measure attitudes of participants and those who have technical knowledge of frameworks. An example of the returned and completed questionnaire is shown in Appendix 5. The predominant feature of the questionnaire is to obtain responses to statements posed concerning the two procurement engagement methods. Most responses are categorical but descriptor variables are available (Oppenheim, 1992), for example, where opinions regarding the research topic are asked. Responses to categorical questions are measured against a balanced Likert (1932) ordinal scale. Wording used in the questionnaire follows suggestions made by Peterson (2000):

- Language – using clear and unambiguous plain spoken English (although of a technical class).
- Succinct – minimum use of words to convey meaning.
- Relevance – making questions relevant for participants to ensure engagement.
- Specific – the questions posed are specifically crafted toward a technically competent audience.
- Objectivity – initial questions (Q6 to Q17) allow a selection of responses which are neutral in construction, whereas Q18 to Q39 are statements which balance each other in opposition. Objectives of neutrality and balance are used to create an unbiased survey.

9.3 Sample size of questionnaire

An assessment was made of the total population of people directly connected with the design, procurement, supervision and management for projects contained within the case study period within the capital works programme. In assessment of the target population, participants from employers and suppliers organisations is through specific qualities that include an active knowledge of construction processes and management techniques (professional knowledge) or a working involvement with the construction industry (operational knowledge). As questionnaires are directed at a specific social class and include technical language, the population was contained

within boundaries of technical disciplines. The total number of participants is estimated within Table 9.1.

Table 9.1: Estimated total population of case study

Organisation	Participant group	Number of participants
Client	Design group – highways section	30
Client	Contracts – quantity surveyors	8
Client	Design group – structures section	30
Suppliers – (9 number)	Estimating and contracts	27
Client	Supervision	32
Suppliers – (9 number)	Supervision and contract management	45
Client	Strategic project management	8
		180

A simple random probability sampling technique was used whereby all 180 participants were chosen through a general contact email – internally to the client organisation and externally to nine suppliers. All nine suppliers had experience of both framework agreements and discrete procurement methods with the client organisation. Within the client organisation, 60 of the 108 participants had a detailed knowledge of framework agreements generally whilst the remainder has a cursory and distant knowledge.

Of the 180 maximum estimated participants, 109 offered to take part in the questionnaire and 100 returned questionnaires that could be used for data collection. Participants who offered to return questionnaires are 60.6% of the total estimated population and returned usable data is 55.6% of the total estimated population. These are very high results that meet the ‘rule of thumb technique’ suggested by Neuman (1994) of 30% minimum sample size for populations under 1000.

9.4 Sociological mix of participants

The questionnaire has been prepared in a sociological context for a specific group of participants. This is a significant departure from generalised research where care must be taken to represent the whole population (Houston and Fiore, 1998). Instead, the questionnaire is specifically targeted to interact with a professional group in order to gain views and opinions from within a professional context. Questions have been constructed using from the context of tacit knowledge and engineering practice (Tourangeau *et al*, 2000). To illustrate the sociological mix of participants, Table 9.2 gives an analysis of responses.

Table 9.2: Analysis of questionnaire responses by profession

Profession	Percentage of response
Engineer – design function	42
Engineer – supervision function	11
Quantity Surveyor	14
Contracts Manager	14
Other	19
Total	100

In recognition of the significant experience and technical abilities of participants, questions have been constructed using a cognitive approach in recognition of sociological group context. Although responses from 19% of participants described themselves as ‘other’, further investigation has revealed that these individuals hold professional qualifications such as a Chartered Engineer or Surveyor, but their current position is that of contracts director, commercial director or similar senior management position.

9.5 Contextual position of participants

Following an examination of the sociological mix, participants were questioned on their involvement with frameworks, involvement with discreet contracts together

with any involvement in marking key performance indicators. The purpose of such enquiry is to:

- Determine a consistent balance from participants who have an experience of projects conducted under a discreet methodology with those who have an experience of frameworks
- Elicit responses from participants who have experiences of both methods of procurement and engagement
- Engage participants who are involved in the marking of performance with those who do not in order to detect any bias in results.

Results obtained are summarised in Table 9.3:

Table 9.3: Participants experience with engagement methods

Question	Yes	No
Are you involved in anyway with the HCC frameworks?	95	5
Have you been involved in anyway with HCC highways projects prior to the frameworks?	82	18
Are you involved in marking key performance indicators or do you supply information for key performance indicators?	65	35

Responses indicate a very high correlation from participants who have had experience of frameworks and discreet projects undertaken within the civil engineering highways sector. This feature is very important because the research seeks to obtain views from those experienced in both methods of procurement so that results can be reliability detected. It is also significant that participants have worked with highways projects so that the variances that may occur through differing specifications, methods of evaluation and measurement can be ignored within the research. This is due to the effect that both HCC frameworks and projects undertaken prior to introduction of the frameworks share the exact highways specification, detailed drawing information and method of measurement irrespective of the procurement method. Participants' responses are therefore not affected by influences arising from these elements.

A review of responses from those involved in key performance marking has been undertaken to detect any skewed bias - either in a positive or negative format – from those responses supplied through participants who do not mark key performance indicators. There is no detectable bias between views from those that mark key performance indicators to the frameworks and those that do not, from the analysis undertaken.

9.6 Questionnaire response results and structure

111 questionnaires were issued to the chosen participants with 100 returned, completed and useable responses received. This represents a 90% response rate which is a very high and satisfactory result, virtually eliminating ‘non-response’ bias (Parashos *et al*, 2005) – especially when placed within a case study context. Further investigation was made to determine the response rate by questioning a number who had returned questionnaires. The matrix of responses is shown in Table 9.4.

Table 9.4: Analysis of responses to the questionnaire

Response area	Percentage of response
Hampshire County Council – design area	42
Hampshire County Council – supervision area	21
Supplier to a framework	26
Other	11
Total	100

Those asked who had returned questionnaires felt a strong desire to give views upon frameworks. A number explained their views by engaging with the current frameworks studied by this research. 82% of participants had experience of the case study frameworks – either through direct involvement or by association and distant knowledge. Many were aware that the current frameworks were around the mid-term life span and wished to give views regarding a replacement engagement process when the framework expires in 2012. All participants questioned felt the research was particularly worthwhile, as very little published information is currently available regarding the research subject. The questionnaire has been written to reflect

a certain level of construction management tacit knowledge and are therefore written using terms and language used by civil engineering professionals. Furthermore, a number of questions are pre-empted with ‘in your opinion’ and the like – to deliberately illicit a cognitive response set against this sociological context (Sudman *et al*, 1996). The questionnaire, with example given in appendix 5, was entitled ‘Framework Research Stakeholder Survey’ in order to encourage a response by stakeholders to the organisation and contemporary associates. Although the offer to participate was made by the researcher to issue a questionnaire, there is no obligation to respond from a participant unless a ‘psychological contract’ (Argyris, 1960) can be established. To assist with constructing such a contract, the following measures were taken:

- A covering letter was sent with the questionnaire which outlined the reason for the research, including results in this thesis and requesting that the participant takes a few minutes to undertake part in this.
- Clear instructions on filling out the questionnaire were given together with a date for response.
- Polite reminders were given to participants close to the response date.
- A participant information sheet outlined the use of the questionnaire for future frameworks by making reference to participant’s professional background.

As Goyder, 1982 commented ‘*the more important or relevant the survey is, the more motivation participants will have to respond.*’

The questionnaire was structured into six distinct sections as stated in Table 9.5.

Table 9.5: Structure of research questionnaire

Section	Question numbers	Content
1	1 to 5 inclusive	Obtaining information of the participant – organisational background, profession, involvement in frameworks, involvement in construction projects, marking performance indicators
2	6 to 17 inclusive	A pre-cursor to the main questions to ensure participants are introduced to the subject matter and introduced to the questionnaire. (McQueen & Knussen, (2002).
3	18 to 39 inclusive	Main body of questionnaire measuring participant opinions using a five point Likert scale against specific statements
4	40 and 41	Question about future framework issues
5	42	Offer to participate in further research
6	Comments	Encouragement for participant comments

Questionnaire responses were catalogued and archived whilst keeping anonymity with data transfer initially made into Microsoft Excel spreadsheets, checked back to back to ensure the data was error free. A trial by summarising arithmetic means outlining results was undertaken to reliability purposes. Microsoft Excel files were transferred into Statistical Package for the Social Sciences (SPSS) version 20.0 with arithmetic means and missing values again checked for errors.

9.7 Detailed statistical analysis of questionnaire responses

Following an initial series of simple statistical tests enabling accumulation of group views regarding specific subjects collated from questionnaire responses, a secondary stage of analysis is undertaken to examine significant sociological factors that represent drivers of group views. Recognition of significant factors allows relationships to be explored through use of multiple regression analysis. Purpose of these tests is twofold:

- To identify the varying factors involved with collective views from the questionnaire and reduce these by the use of factor analysis to provide key independent variables for further analysis.
- To explore the relationship between independent and dependant variables and use these to determine if correlation exists between project outcomes and sociological group views.

A progressive structured approach is used to analyse data to the following order:

- 1 Results dissected into sections to match mathematical properties of scale responses contained in the questionnaire. Results are grouped into those using a multiple choice scale of three and a Likert scale of five.
- 2 A series of tests of normality of participants with responses.
- 3 Manipulation of raw data from the questionnaires so that responses to negatively worded questions are reversed and results are aligned.
- 4 Empirical analysis of reliability, normality and skewness.
- 5 Factor analysis to identify predominant factors from questionnaire responses
- 6 Regression analysis to determine the extent to which independent variables contribute toward dependant variables.

9.8 Dissection of questionnaire into sections to match scales used

Mathematical properties of the questionnaire differ according to the scale used, the questions posed and the psychological structure of the content. As an introduction, section 2 of the questionnaire comprised questions asking for opinions from participants. Participants choose one closed response from a selection of three alternatives. The alternatives are (a) traditional procurement method, (b) framework agreement method, or (c) neutral position. Actual questions asked comprised a mixture of topics and categories, with positively or negatively worded statements in an apparently unstructured manner to encourage honesty of responses. A deliberate mixture reduces pattern detection by participants and allows reliable consistent opinions to be recognised – for example use of a question posed twice at separate

points in the questionnaire with positive and negative wording styles (Labaw, 1980). The scale used to measure responses for section 2 of the questionnaire is between the values of 1 and 3.

Section 3 of the questionnaire comprised a statement and participants are requested to select a graded closed 5 position Likert response. Alternatives range from strongly agree to strongly disagree and participants are also allowed to insert 'not applicable' if they felt they could not respond to a statement. As with section 2, questions are mixed regarding topics and categories, and are positively or negatively worded to encourage honesty of responses. The scale used to measure responses for section 3 of the questionnaire is between the values of 1 and 5 for graded answers plus value 6 for a 'not applicable' choice.

9.9 Checking reliability of scales used with questionnaire construction

A check for reliability of scales used for collection of data from the questionnaire is an essential element with which to understand the underlying statistical construct. Both sections of the questionnaire are checked for internal consistency using Cronbach's alpha coefficient. Results from this analysis are shown in Table 9.6.

Table 9.6: Cronbach's alpha reliability statistics for sections 2 and 3 of the questionnaire

Questionnaire section	Cronbach's Alpha	N of Items
Section 2 – questions 6 to 17	.747	12
Section 3 – 18 to 39	.901	22

Commentary upon results of Table 9.6:

Both sections of the questionnaire achieve Cronbach's alpha values in excess of 0.7 and the scales for both can be considered reliable. Further investigation into individual items for section 2 and section 3 reveals a range of alpha value scores from 0.255 to 0.891. Low values below 0.3 may be removed if considered affecting the overall result – but as these are single isolated values, results have been included with the analysis.

Significant questions posed to participants – namely those that relate to performance outcomes, critical success factors and economic information measured against projects during quantitative analysis of this research – were tested for normality

using the descriptive statistics tools of SPSS. Results obtained from section 2 provides a strategic sociological group view of the preference between discrete and framework agreements for three critical success factors identified during quantitative analysis. This serves two purposes:

- A reference from the sociological group towards one engagement method or the other - or an opportunity to give a neutral response. Participants to the questionnaire are not aware of critical success factor results and therefore views are given from tacit knowledge of working with discrete and framework agreement projects.
- If a sociological group view correlates with critical success factor results, this offers a form of triangulation where qualitative and quantitative methods align.

9.9.1 Views concerning the critical success factor 1A of starting on time

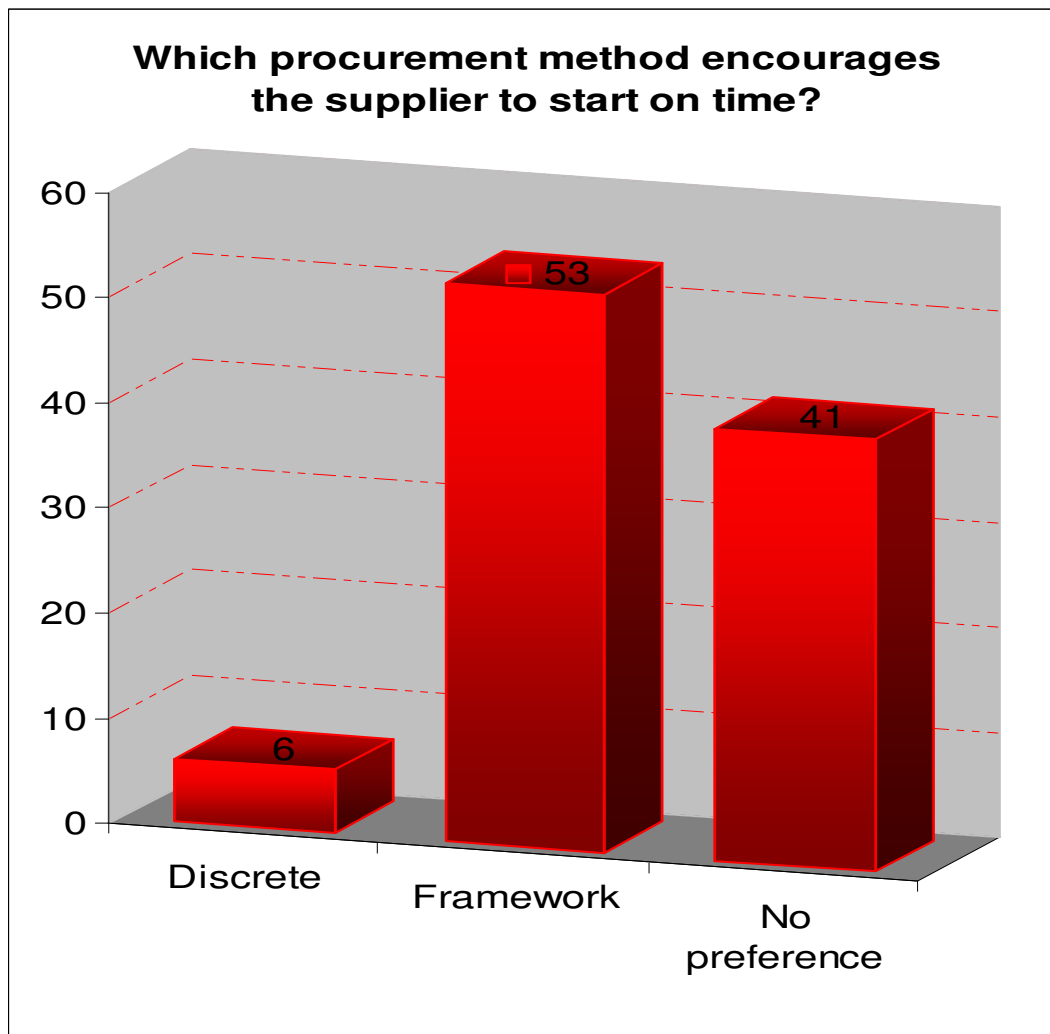


Figure 9.1: Results from questionnaire (Q6) regarding starting on time

Commentary upon Figure 9.1:

Participants placed the framework method of engagement as the prime method (53%) of encouraging suppliers to start on time but a significant number (41%) felt the procurement method did not make any difference. A very small number (6%) felt that traditional methods encouraged starting on time. Comparison with normal distribution was not expected because of polarised views from participants.

9.9.2 Views concerning the critical success factor 1B of finishing on time

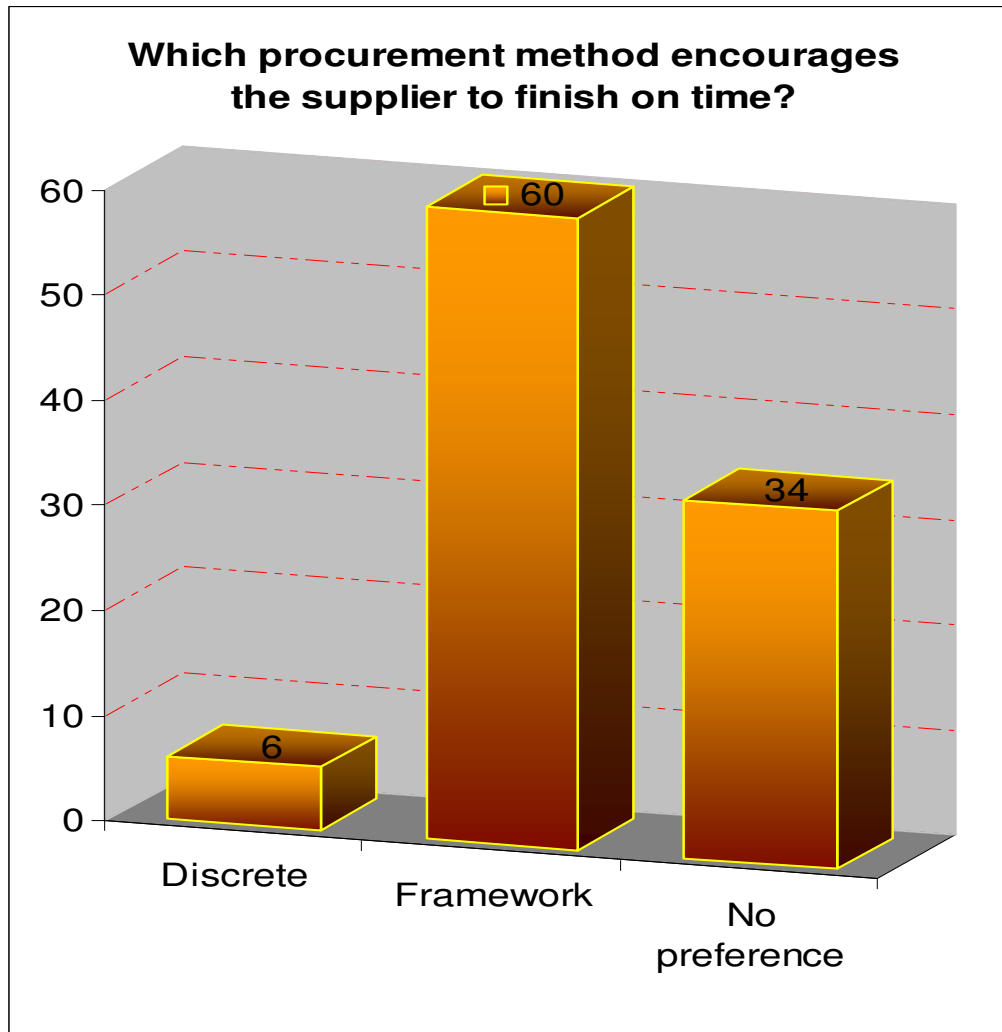


Figure 9.2: Results from questionnaire (Q7) regarding finishing on time

Commentary upon Figure 9.2:

Participants placed the framework method of engagement as significantly the most effective method (60%) of encouraging suppliers to finish on time whereas (34%) felt the procurement method did not make any difference. A very small number (6%) felt that traditional methods encouraged finishing on time. If the frequencies in Figure 9.2 are transposed, a normal distribution curve can be applied with framework methods forming the central tendency.

9.9.3 Views concerning the critical success factor 3 for fewer defects

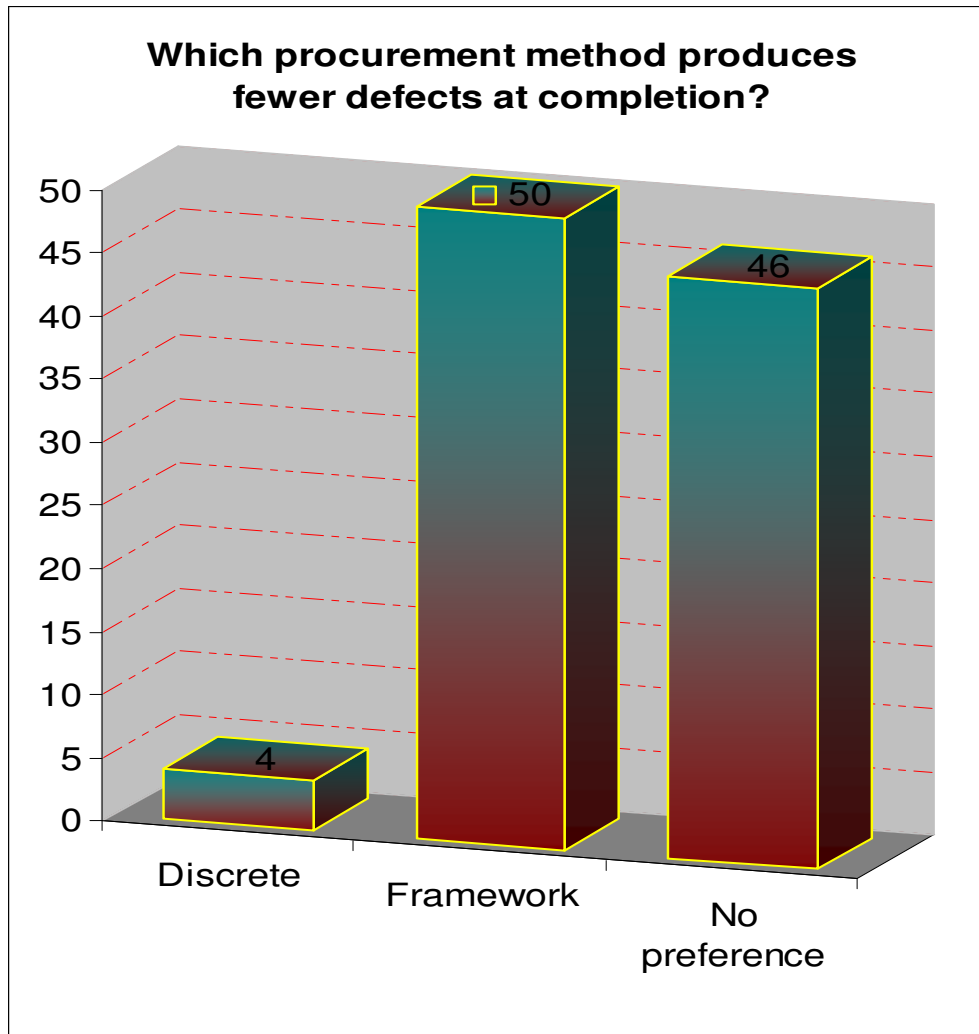


Figure 9.3: Results from questionnaire (Q8) regarding fewer defects at completion

Commentary upon Figure 9.3:

Participants placed the framework method of engagement as the prime method (50%) of encouraging suppliers to produce fewer defects at completion but only marginally ahead of a significant number (46%) who felt the procurement method did not make any difference. A very small number (4%) felt that traditional methods encouraged fewer defects. Comparison with normal distribution was not expected because of polarised views from participants.

9.10 Tests of normality of participants responses

Following reversal of negatively worded questions used in the psychological context of the questionnaire to align measures, tests of normality are undertaken prior to conducting further statistical techniques. This is to assess the distribution of scores from responses from section 3 of the questionnaire and determine if results align with normal distribution (Gravetter and Wallnau, 2000, p52).

Descriptive statistics concerning information on variables are explored for section 3 of questionnaire responses (questions 18 to 39 inclusive). Although at a later stage only questions which relate to sociological behaviours will be examined, the whole response to section 3 is analysed. The analysis is dissected into four groups to detect if any bias between groups is present. Results are shown in Table 9.7.

Table 9.7: Descriptive statistics of responses for section 3 of the questionnaire

Organisational group			Statistic	Std. Error
Section 3 Q18 to Q39	Design section	Mean	69.8571	2.08238
		95% Confidence Interval for Mean	Lower Bound	
			65.6517	
		Upper Bound	74.0626	
		5% Trimmed Mean	71.1005	
		Median	71.5000	
		Variance	182.125	
		Std. Deviation	13.49539	
	Supervision section	Skewness	-2.658	.365
		Kurtosis	11.697	.717
		Mean	77.6190	1.60724
		95% Confidence Interval for Mean	Lower Bound	
			74.2664	
		Upper Bound	80.9717	
		5% Trimmed Mean	77.8598	
		Median	78.0000	
		Variance	54.248	
	Framework supplier	Std. Deviation	7.36530	
		Skewness	-.726	.501
		Kurtosis	-.142	.972
		Mean	75.1538	2.53085
		95% Confidence Interval for Mean	Lower Bound	
			69.9415	
		Upper Bound	80.3662	

		5% Trimmed Mean	75.8761	
		Median	76.5000	
		Variance	166.535	
		Std. Deviation	12.90486	
		Skewness	-1.119	.456
		Kurtosis	3.969	.887
	Other	Mean	74.4545	2.75471
		95% Confidence Interval for Mean		
		Lower Bound	68.3167	
		Upper Bound	80.5924	
		5% Trimmed Mean	74.0606	
		Median	73.0000	
		Variance	83.473	
		Std. Deviation	9.13634	
		Skewness	.816	.661
		Kurtosis	-.281	1.279

Commentary upon Table 9.7:

Four independent variables are selected that represents four groups of participants – designers, supervisors, suppliers and others. The purpose of this is to assess normality for each group and determine normality for the section. Output from Table 9.7 indicates:

- All four groups within 5% trimmed means with means very close in value and few outlying scores.
- Skewness values are negative for three groups (designers, supervisors, suppliers) indicating clustering of scores at the high value end whereas ‘others’ produced a positive value.
- Kurtosis values range from positive 11.697 to negative 0.281 giving a range from high and peaked to relatively centred.
- Mean and median values are similar for all groups but standard deviation values for ‘supplier’ and ‘designer’ groups are wider than ‘Others’. Standard deviation values are polarised with two pairs of groups.

Tests of normality applied to section 3 data:

Table 9.8: Tests of normality for responses to section 3 of the questionnaire

Organisational group	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Section 3 Q18 to Design section	.193	42	.000	.783	42	.000
Q39 Supervision section	.140	21	.200 [*]	.926	21	.114
Framework supplier	.156	26	.103	.898	26	.014
Other	.160	11	.200 [*]	.921	11	.323

Table 9.8 applies two tests of normality – Kolmogorov-Smimov and Shapiro-Wilk. As the dataset comprises less than 2000 elements, the Shapiro-Wilk results are examined. Where the p value (Sig.) is more than alpha = 0.05, results can be considered normal. Two results (supervision and other) can be considered of normal distribution and results are explored further using graphical normal Q-Q plots.

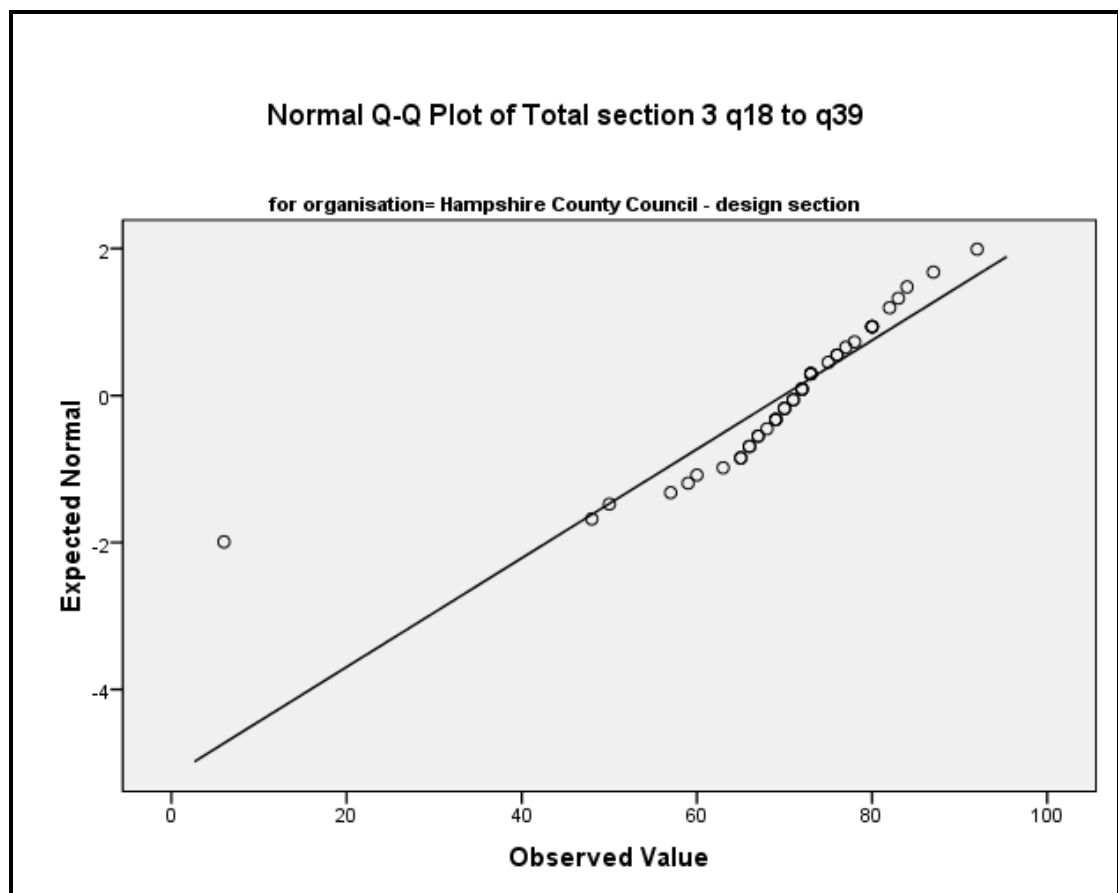


Figure 9.4: Normal Q-Q plot for Section 3 of the questionnaire –responses from design function

Commentary upon Figure 9.4:

Although the Shapiro-Wilk p value results indicated that this group (design) did not have a normal distribution, use of a normal Quartile-Quartile plot shows a distribution of results that fit the normal distribution line reasonably well. Results are evenly spaced along the x-y axis with a slight reverse line profile. Apart from one outlier the distribution is accepted as suitable for further analysis.

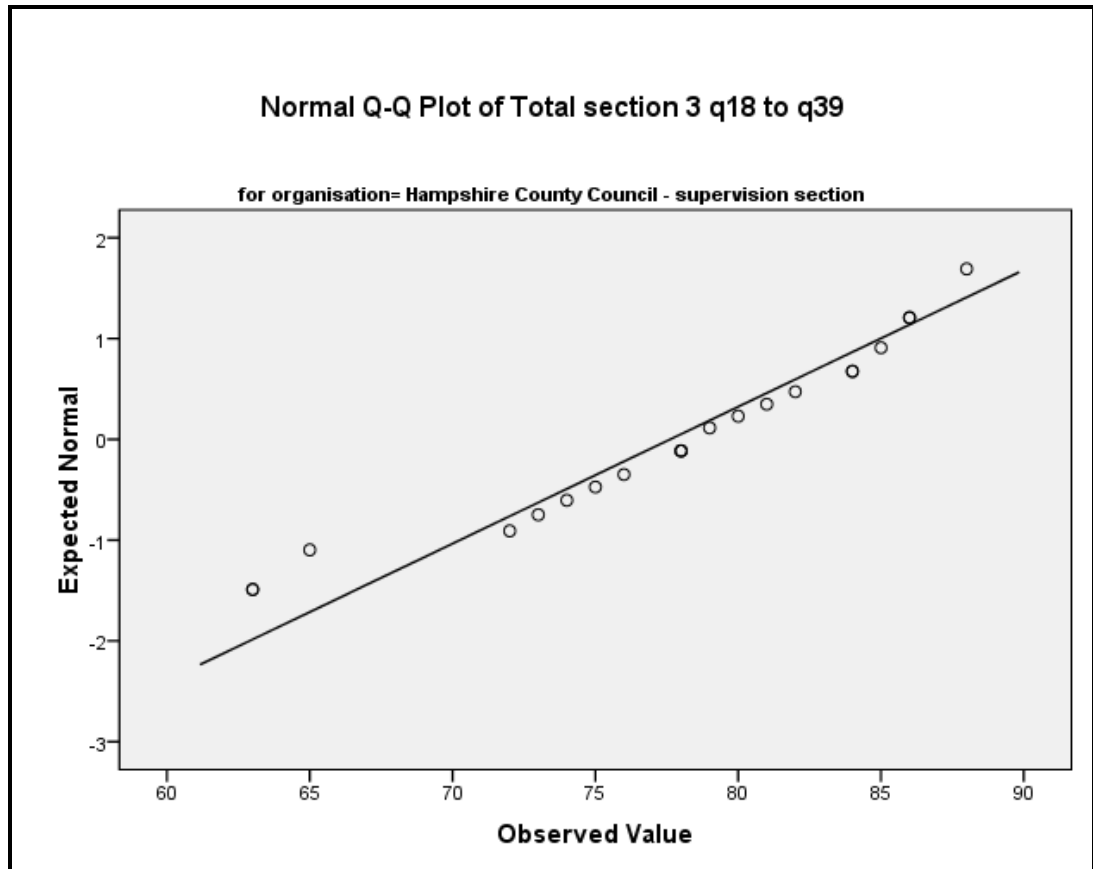


Figure 9.5: Normal Q-Q plot for Section 3 of the questionnaire –responses from supervision function

Commentary upon Figure 9.5:

The Shapiro-Wilk p value results indicated that this group (supervision) did have a normal distribution. Normal Quartile-Quartile plot shows a distribution of results that follow a normal distribution line in overall context with results evenly spaced along the x-y axis to a slight reverse line variable curve profile. Values are toward the higher end of the scale. Aside from three values the overall profile is balanced throughout the line and this distribution is accepted as a normal distribution for further analysis.

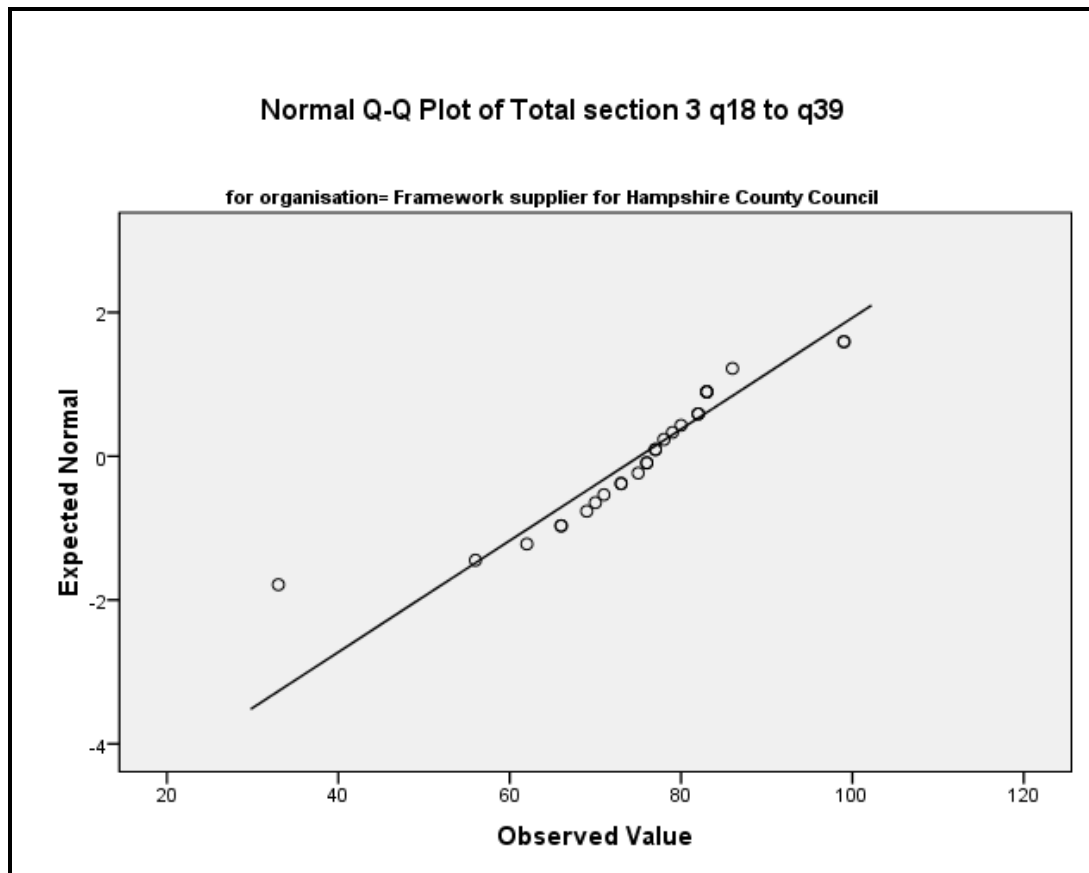


Figure 9.6: Normal Q-Q plot for Section 3 of the questionnaire –responses from framework supplier

Commentary upon Figure 9.6:

Although the Shapiro-Wilk p value results indicated that this group (framework supplier) did not have a normal distribution, use of a normal Quartile-Quartile plot shows a distribution of results that fit the normal distribution line reasonably well, aside from a single value. Results are evenly spaced and centralised along the x-y axis, with a slight reverse line profile. Apart from one outlier the distribution is accepted as suitable for further analysis.

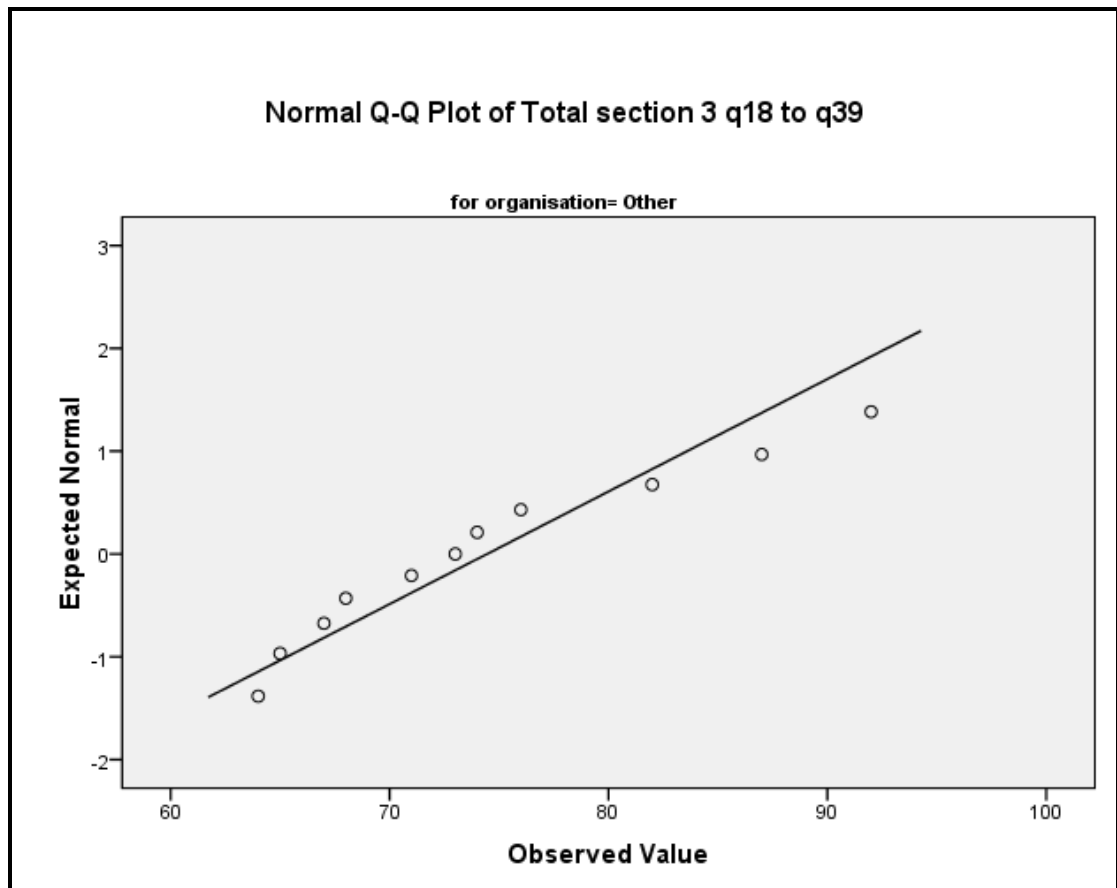


Figure 9.7: Normal Q-Q plot for Section 3 of the questionnaire –responses from other group

Commentary upon Figure 9.7:

The Shapiro-Wilk p value results indicated that this group (other organisation) did have a normal distribution. The normal Quartile-Quartile plot shows a distribution of results that follow a normal distribution line in overall context with results evenly spaced along the x-y axis to a slight variable curve profile. Values are toward the lower end of the scale. The overall profile is balanced throughout the line and this distribution is accepted as suitable for further analysis.

Aggregation of group responses to section 3 of the questionnaire are examined using a boxplot diagram constructed for visual analysis.

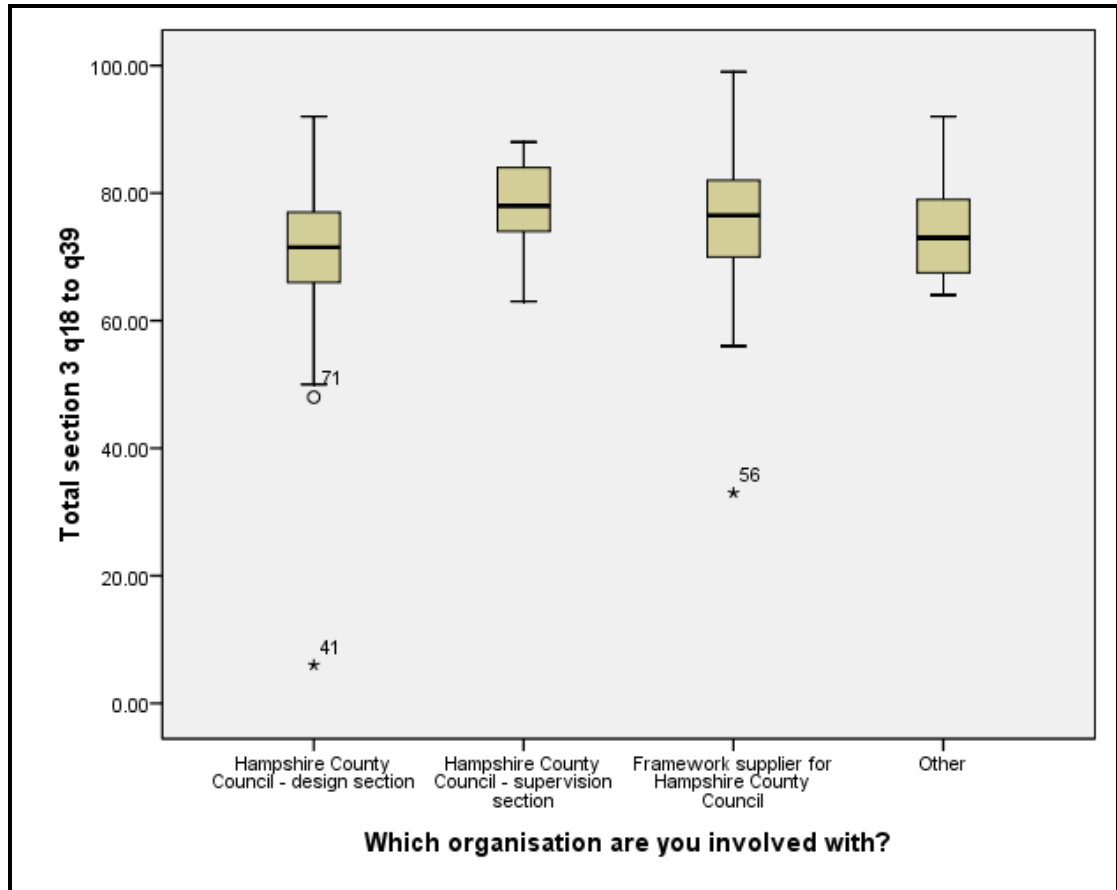


Figure 9.8: Boxplot results for all participants for Section 3 of the questionnaire

Commentary upon Figure 9.8:

The boxplot in Figure 9.8 shows a vertical representation of the data. Length of the box represents the spread of data between 25th and 75th percentiles. All four groups exhibit the same spreads of data and median values of central tendency (represented by the horizontal lines). Vertical whiskers, which show the extent of largest and smallest values (excluding outliers) are balanced for design and supplier groups. The supervision section group appears slightly negatively skewed whereas the other group is very positively skewed. There is one outlier and one extreme in the design group and an extreme in the supplier group.

Although minor variances in the overall data scores are present between the groups, these represent marginal differences. All four groups are predominantly similar in terms of spread of data with median values close to central tendency. The overall profile for aggregation of the groups is accepted as within normal variances.

9.11 Identification of questions from section 3 of the questionnaire which relate to sociological behaviour factors

Results obtained from section 3 are used to examine factors of sociological group drivers to examine views comparable to those discovered through the literal review. Selected questions within the questionnaire are isolated for specific analysis allied to the areas of literal discovery. In addition to the questions posed for subject matter of relationships, communication, incentives and satisfaction, a number of other questions are included to provide comparative analysis. A review of questions contained in section 3 is given below together with an explanation of rationale in Table 9.9. Only questions that are relevant toward sociological behaviours are included with this stage of analysis. Questions that duplicate through reverse statements are ignored because these are used to test reliability of participant responses.

A literary review of organisational behaviours for construction research undertaken in chapter three identified 26 behaviours that contributed toward positive results in project outcomes. These were refined with further literature to produce the ten most significant behaviours for effective behaviours. A pilot study identified four behaviours that participants ranked most significant.

The same ten behaviours identified from research into characteristics of high performance organisations (Akdemir *et al*, 2010) were included among questions posed within the research questionnaire and issued to all participants. Responses were filtered to remove reverse test questions and the remaining ten questions are included in Table 9.9 for analysis.

Table 9.9: Identification of behaviour factor questions for factor analysis

Question number	Predominant sociological behaviour factor	Literature source reference
21	Relationships (long term)	McCann (2004)
22	Communication	Greenberg & Baron (2003)
23	Decision making	Fischman <i>et al</i> , (2004)
24	Knowledge transfer	Keskin (2005)
25	Incentives	Eriksen (2001)
29	Trust	Culyer (2001)
30	Empowerment	Green (2002)
35	Diversity	Milakovich & Gordon (2001)
36	Satisfaction	Fischman, <i>et al</i> (2004)
37	Motivation	Greenberg & Baron (2003)

Prior to conducting factor analysis, results obtained for three sociological behaviours from section 3 of the questionnaire are examined using simple statistics to determine if a differential group view exists between discrete and framework agreements. The three questions selected are Q21, Q22 and Q25, which represent results for sociological behaviours of the drivers recognised by Akdemir (2000) and included with the procurement model developed by this research. Inference of this initial examination will give confidence toward use of a deeper factor analysis method.

9.11.1 Views concerning long term relationships and framework agreements

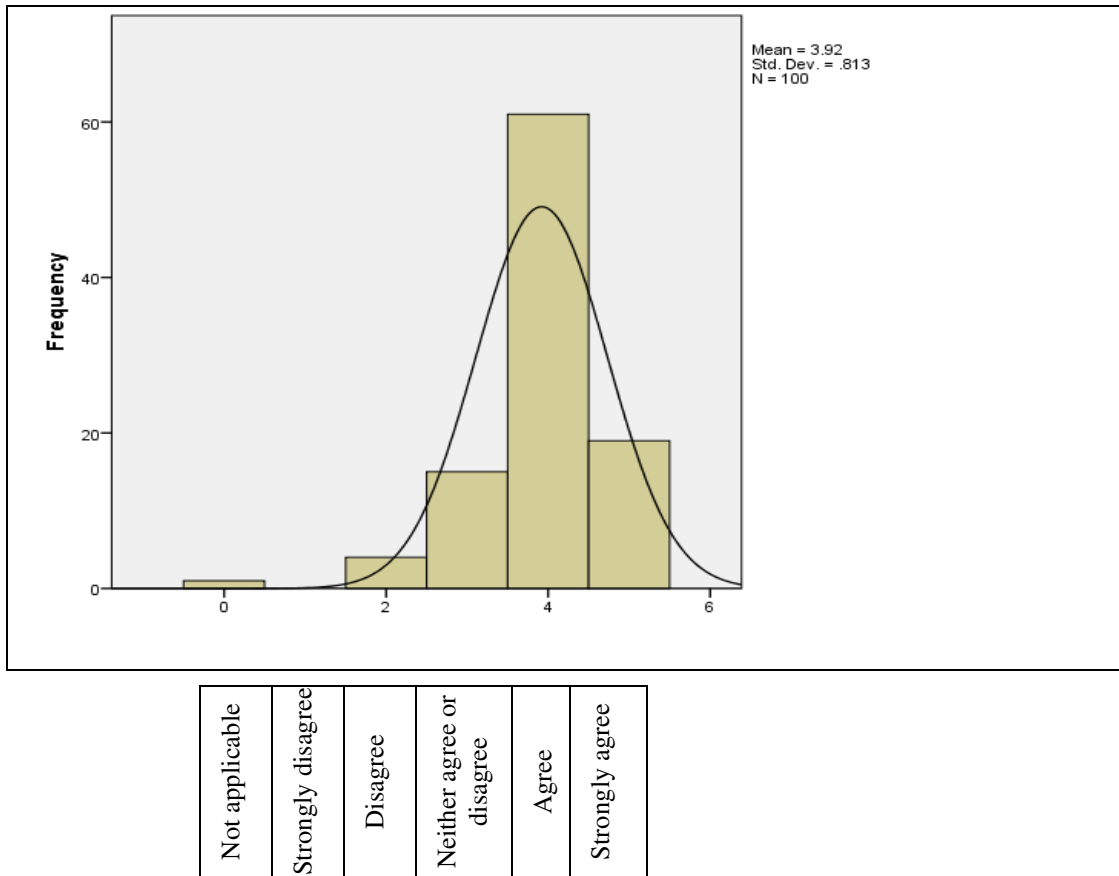


Figure 9.9: Results from question (Q21) - *frameworks encourage continuous improvement due to the longer term relationships between participants*

Commentary upon Figure 9.9:

The purpose of this question was to elicit views regarding encouragement of continuous improvement within frameworks due to longer term relationships between parties. It was anticipated that participants would predominantly agree that frameworks would encourage higher levels of performance due to the focus upon measurement of such criteria. Wording of this question was deliberately biased toward the favour of frameworks and respondents significantly agreed with the proposition. 60% of respondents agreed with the statement whilst 17% remained neutral upon the question. Only 4% disagreed with the statement. Results produce a peaked distribution curve due to a skew toward the affirmative.

9.11.2 Views concerning communication

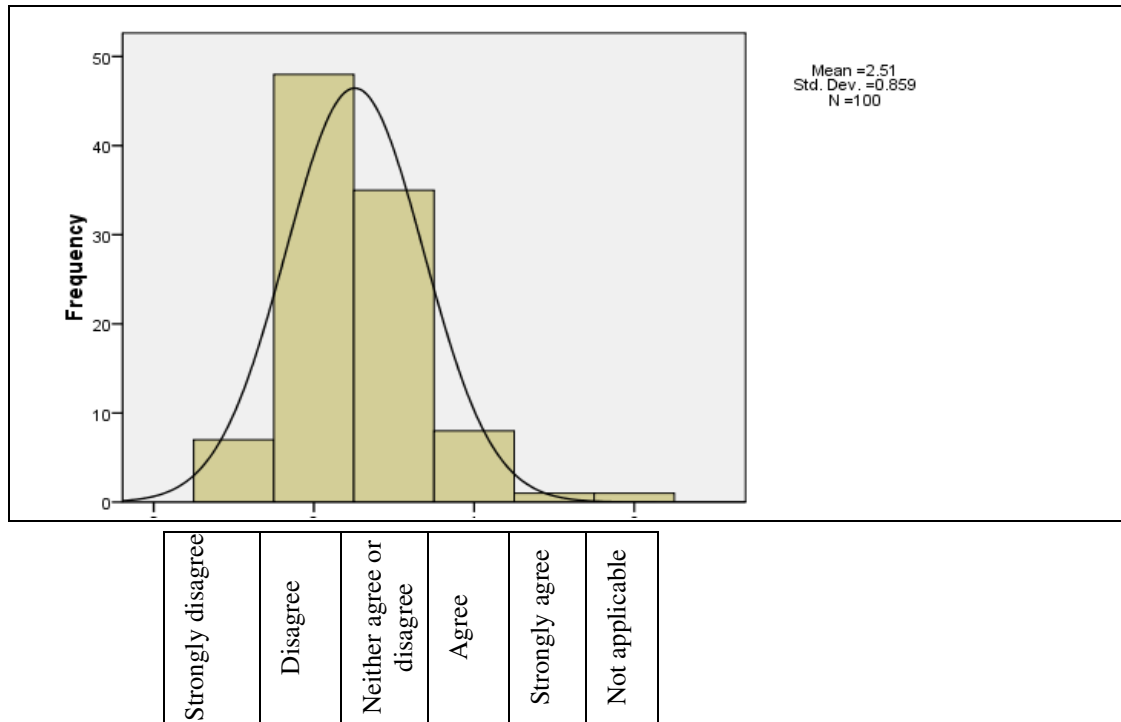


Figure 9.10: Results from question (Q22) - *communication between participants is clearer with traditional projects*

Commentary upon Figure 9.10:

The purpose of this question was to elicit views regarding clarity of communication between participants for traditional procurement methods. It was anticipated that participants would predominantly agree that traditional projects would encourage clearer channels of communication due to knowledge and extent of use. Framework agreements are a relatively new phenomenon and therefore introduction may impede communication between parties. The wording was deliberately biased against framework agreements to reflect an anticipated view but respondents disagreed with the proposition. 48% of respondents disagreed with the statement whilst 34% remained neutral upon the question. A small number 8% agreed with the statement made whilst a similar number strongly agreed. Strength of views produces a skewed normal distribution curve but is reasonably distributed.

9.11.3 Views concerning incentives

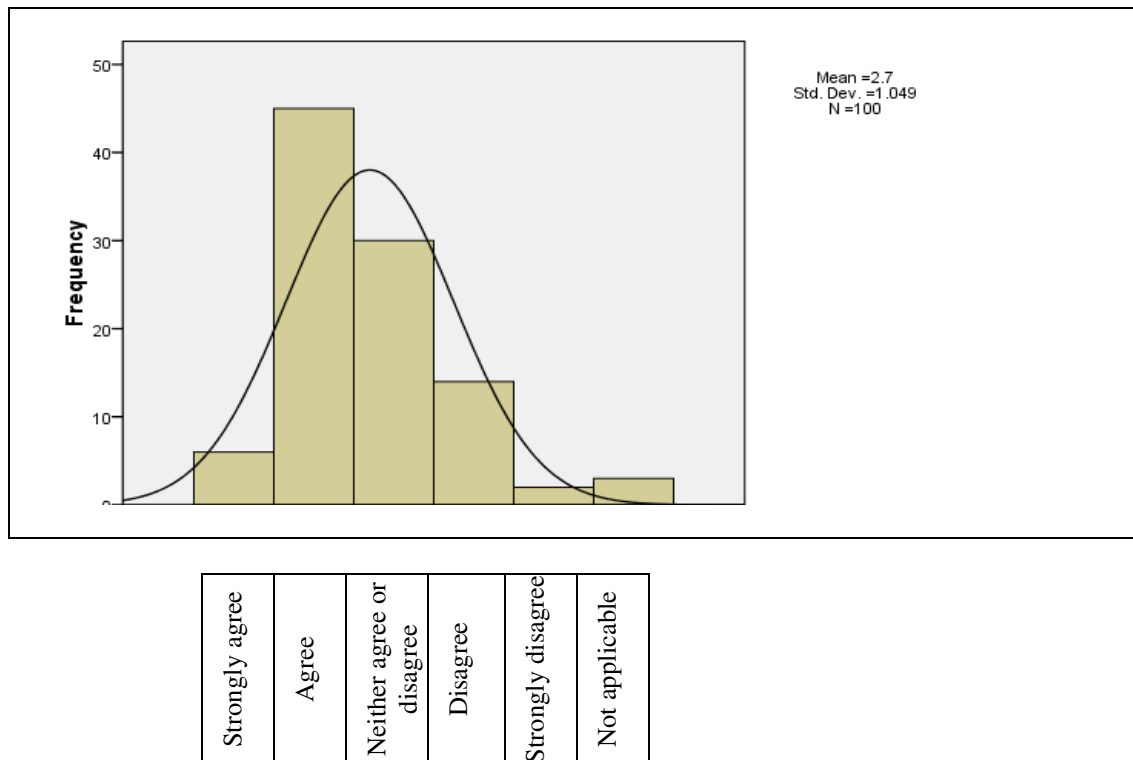


Figure 9.11: Results from question (Q25) – *frameworks are more effective when using incentives between parties*

Commentary upon Figure 9.11:

The purpose of this question was to elicit views regarding the management and sharing of rewards between participants of a framework. It was anticipated that participants would predominantly agree that framework agreements would allow rewards to be managed and shared. The proposition assumed that use of key performance indicators would benefit all. Wording of this question was deliberately biased toward the anticipated view and respondents agreed with the proposition. 45% of respondents agreed with the statement whilst 30% remained neutral upon the question. A small number, 13% disagreed with the statement proposed. Strength of views produced a normal distribution curve but skewed toward the predominant view of questionnaire participants.

9.12 Manipulation of questionnaire responses

In order to undertake further analysis of questionnaire responses, alignment of values is necessary for positively and negatively worded statements. Behaviour factors identified in Table 9.9 are set against values and aligned through manipulation as stated in Table 9.10. The manipulated value places support toward framework agreement contracts preference as value 5 and support toward traditional preference as value 1.

Table 9.10: Section 3 questions showing links to sociological categories, original response values and manipulated values

Question Number	Sociological category	Original response values	Manipulated values
Q21	Relationships (long term)	Strongly agree = 1 Agree = 2 Neutral = 3 Disagree = 4 Strongly disagree = 5 Not applicable = 6	Strongly agree = 5 Agree = 4 Neutral = 3 Disagree = 2 Strongly disagree = 1 Not applicable = 0
Q22	Communication	As above	As original values
Q23	Decision making	As above	Reversed as for question 21
Q24	Knowledge transfer	As above	As original values
Q25	Incentives	As above	Reversed as for question 21
Q29	Trust	As above	Reversed as for question 21
Q30	Empowerment	As above	Reversed as for question 21
Q35	Diversity	As above	Reversed as for question 21
Q36	Satisfaction	As above	As original values
Q37	Motivation	As above	Reversed as for question 21

9.13 Use of factor analysis for sociological behaviour questions

Confirmation of reliability of questionnaire results allows data analysis to be undertaken using factor analysis. The purpose of factor analysis is to identify a small set of factors that represent the underlying relationships among a group of related variables. Such factors, known as components are used to identify correlated views. Factor analysis is undertaken to questions contained in section 3 of the questionnaire related to sociological behaviours identified in Table 9.10.

The reliability of factor analysis and correlation of coefficients is dependant upon sample size. Tabachnick and Fidell (2001) recommend a ratio of five cases per variable whereas Kass and Tinsley (1979) recommend 10 in order to provide stable

and meaningful results. Table 9.10 proposes ten variables with data from a population of 100. This sample provides sufficient data for analysis.

9.14 Factor analysis part 1: assessing the data and extracting the factors for responses to sociological behaviour questions

SPSS version 20.0 is used to provide five elements of output from the questionnaire data. These are correlation matrix, KOM and Bartlett's test, total variance explained, a screeplot and component matrix. Each is presented in turn:

Table 9.11: Correlation matrix for section 3 behaviour questions

	Q21	Q22	Q23	Q24	Q25	Q29	Q30	Q35	Q36	Q37
Q21	1.000	.346	.457	.412	.514	.356	.149	.317	.435	.488
Q22	.346	1.000	.264	.399	.284	.352	.197	.253	.288	.237
Q23	.457	.264	1.000	.440	.609	.374	.128	.409	.291	.430
Q24	.412	.399	.440	1.000	.458	.302	.233	.318	.413	.337
Q25	.514	.284	.609	.458	1.000	.429	.200	.427	.375	.505
Q29	.356	.352	.374	.302	.429	1.000	.182	.298	.233	.442
Q30	.149	.197	.128	.233	.200	.182	1.000	.347	.235	.216
Q35	.317	.253	.409	.318	.427	.298	.347	1.000	.540	.550
Q36	.435	.288	.291	.413	.375	.233	.235	.540	1.000	.454
Q37	.488	.237	.430	.337	.505	.442	.216	.550	.454	1.000

Table 9.12: KMO and Bartlett's test for section 3 behaviour questions

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.861
Approx. Chi-Square		311.357
Bartlett's Test of Sphericity	df	45
	Sig.	.000

Commentary upon results of factor analysis part 1 for responses to behaviour questions:

The Correlation Matrix shows a significant number of coefficients above 0.3 (68 of n=100) and the KMO measure of sampling adequacy at 0.861 is substantially above a minimum value of 0.6 recommend by Kaiser (1974). Correlation values from Table 9.11 do not exceed 0.609 - well below the 0.9 threshold for elimination of variables due to singularity in the data. In addition, Bartlett's Test of Sphericity is significant (p=0.000) and therefore factor analysis is statistically appropriate for use.

Table 9.13: Total variance explained test for section 3 behaviour questions

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings	
	Total	% of Variance	Cumulative %	Total	% of Variance
1	4.272	42.723	42.723	4.272	42.723
2	1.049	10.486	53.209	1.049	10.486
3	.928	9.284	62.493		
4	.801	8.008	70.502		
5	.725	7.253	77.755		
6	.582	5.818	83.573		
7	.520	5.196	88.769		
8	.427	4.268	93.037		
9	.378	3.779	96.815		
10	.318	3.185	100.000		

Table 9.13 determines linear components by calculating eigenvalues of the *R*-matrix and applying a particular vector according to the magnitude of the value. Ten linear components relate to the ten factor variables provided by the questions. All eigenvalues are displayed prior to extraction and only those exceeding 1 are shown after rotation. The first component has an eigenvalue significantly more than one and the second component is just over the threshold.

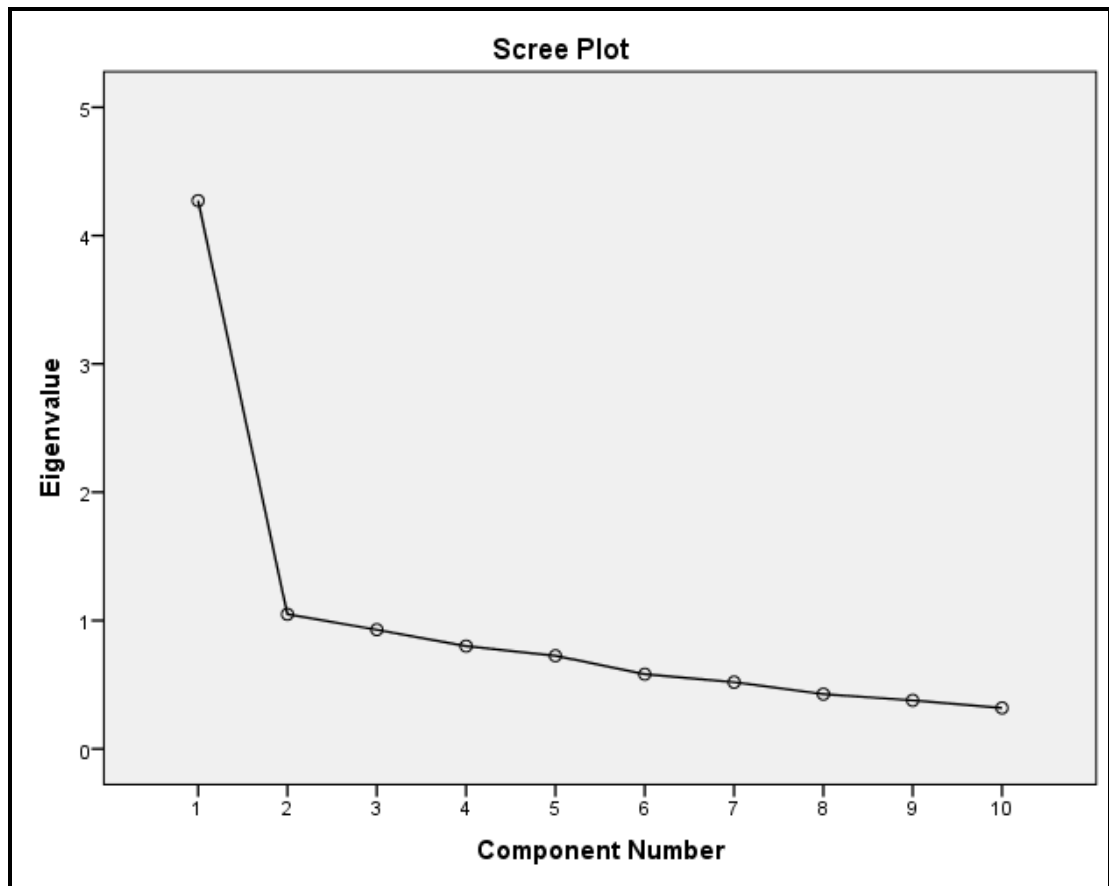


Figure 9.12: Scree plot for section 3 behaviour questions

The scree plot diagram is shown in Figure 9.12. A point of inflexion along the 'curve' occurs after the second factor, with successive factors tailing away along a stable plateau. The scree plot confirms justification to retain two factors for analysis.

Table 9.14: Component matrix for section 3 behaviour questions

	Component	
	1	2
Q25 Incentives	.763	
Q37 Motivation	.737	
Q21 Relationships	.706	
Q23 Decision making	.699	-.336
Q35 Diversity	.691	.416
Q24 Knowledge transfer	.665	
Q36 Satisfaction	.662	.325
Q29 Trust	.606	
Q22 Communication	.532	
Q30 Empowerment	.389	.691

Extraction Method: Principal Component Analysis.^a

a. 2 components extracted.

Table 9.14 lists the loadings of each variable onto each factor with two factors prevalent. In the analysis a suppression value of 0.3 was used – but all variables apart from *empowerment*, loaded highly with the single factor. The range of values – apart from four (.325, .336, .389 and .416) indicate a close correlation of variables.

9.15 Factor analysis part 2: rotating the data and identifying themes from responses to sociological behaviour questions

From part 1 analysis, the outputs are within acceptable limits and two factors are identified as being significant for analysis of rotated component matrix and total variance. Each is presented in turn:

Table 9.15: Rotated component matrix for section 3 behaviour questions

	Component	
	1	2
Q25 Incentives	.778	
Q23 Decision making	.772	
Q21 Relationships	.725	
Q29 Trust	.636	
Q24 Knowledge transfer	.608	
Q37 Motivation	.602	.428
Q22 Communication	.486	
Q30 Empowerment		.793
Q35 Diversity	.373	.715
Q36 Satisfaction	.395	.623

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.^a

a. Rotation converged in 3 iterations.

Results from the component matrix (Table 9.15) are recalculated to provide loadings for each factor after rotation. Table 9.15 shows the output after a suppression of less than 0.3 was used – all variables exceeded this value. The variables are listed in order of magnitude of factor loading. Three variables loaded onto two components, but these were strongly biased toward one factor.

Table 9.16: Total variance for section 3 behaviour questions

Component	Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %
1	3.396	33.965	33.965
2	1.924	19.244	53.209

Extraction Method: Principal Component Analysis.

Summation of the factor analysis results:

Responses from participants to questions regarding ten behaviours for successful group performance included within the questionnaire were subject to an examination of suitability for factor analysis. Inspection of the correlation matrix revealed a significant number of coefficients above .3 (68 out of 100). The KMO value was .861 and Bartlett's test reached statistical significance supporting use of data for factor analysis. Eigenvalues exceeded 1 for two components, explaining 42.7% and

10.5% of the variance respectively. An inspection of the scree plot revealed a break after the second component.

To aid with interpretation of the two components, Varimax rotation was performed and showed six strong loadings with three cross loadings. The strongest values loaded substantially on one component. The two component solution explained a total of 53.2% of the variance, with component 1 contributing 33.9% and component 2 contributing 19.2%.

9.16 Checking of results through measure of central tendency

As a conformational check to the factor analysis, the ten behaviour characteristics tested through responses from participants were subjected to a measure of central tendency using a mean score. For this check, responses were assigned a ranking against participant responses for a Likert scale between 1 and 5 to the manipulated values in Table 9.10. This means that a behaviour characteristic preference response toward framework agreements scores a higher value.

Table 9.17: Measure of central tendency for the ten behaviours

	Q21	Q22	Q23	Q24	Q25	Q29	Q30	Q35	Q36	Q37
	Rel	Com	Des	Kn	Inc	Tru	Emp	Div	Sat	Mot
Mean	3.92	3.49	3.25	3.25	3.30	3.35	2.31	3.21	3.26	3.30
Rank	1	2	7	7	4	3	10	9	6	4

As with results explored through factors analysis, participant responses provide close values. Participants do indicate that relationships are of prime importance with successive ordered ranking on communication, trust, motivation and incentives. Although measures of central tendency (in Table 9.17) represent an approximate method of analysis, the checking process does provide an interesting comparison with factor analysis results.

9.17 Summary of quantitative study of questionnaire responses

The opening paragraph of this chapter outlined a purpose and positioning of the questionnaire as an opportunity to gain knowledge from views of experienced practitioners to assist with the primary research question, namely the effectiveness of a framework agreement within the case study research.

Responses to the questionnaire were thoroughly checked for bias, consistency and statistical reliability followed by an assessment of sample size in order to determine representation with the sociological group being studied. Three critical success factors were chosen to question participant views – CSF1A (starting on time), CSF1B (finishing on time) and CSF3 (Defects). Participants favoured framework agreements in majority for each by 53%, 60% and 50% respectively.

Alignment of the ten behaviours for successful performance was aligned with specific questions from the questionnaire in Table 9.9 to prepare data for further examination. Prior to conducting factor analysis three questions were subject to simple statistical enquiry. All three questions (Q21, Q22 and Q25) received strong participants' responses indicating a correlative group view. All three also indicated a preference to the framework procurement method.

Summation of factor analysis results provides two components – with one factor of significance. Component 1 includes incentives, decision making, relationships, trust and knowledge transfer with loadings exceeding .6. Component 2 provides empowerment with a factor loading exceeding .6. Examination of the original questions posed provides commonality between loaded factors. All five loadings within component 1 relate to duration – a continuance of passage of time – during which the behaviours can be effective. Component 2 relates to authority – within the sociological group. Factor 1 can therefore be labelled *duration* and factor 2 *authority*. A measure of central tendency was used to check responses from the ten behaviour questions. Three behaviours (relationships, trust and motivation) aligned with strong factor loadings.

Results from the questionnaire survey are further validated and explained by in-depth interviews.

CHAPTER 10: QUALITATIVE STUDY: ANALYSIS OF THE EMPIRICAL FINDINGS UPON PERFORMANCE DRIVERS – INTERVIEWS

10.1 Introduction

Following receipt and analysis of questionnaires, a number of participants were offered the opportunity to undertake an interview. The main purpose of these interviews is to capture information for group sociological class data of case study participants. Qualitative research interviews are used to '*describe the meanings of central themes in the life world of the subjects. The main task in interviewing is to understand the meaning of what the interviewees say*' (Kvale, 1996). Interviewees are of a certain sociological class, those of professionally qualified construction professionals with significant experience of projects and therefore are expected to share similar views.

In this chapter, interviews are constructed to reflect the sociological class of participants by asking technically challenging questions in order to provide insight into views. These views are coded using themes so that patterns of correlation may be detected by frequency. Arrangement by frequency allows strength of group views to be placed into a hierarchy thereby creating an order to interview responses. Conclusions from the interview analysis are placed in context of the case study.

10.2 Interview construction

Interviews are constructed to respect the contribution and tacit knowledge of interviewees in order to obtain '*the story behind a participant's experiences*' (McNamara, 1999). The interviews are conducted from a phenomenological perspective in order to collect evidence by removing all traces of personal involvement from the researcher (Remenyi *et al*, 1998). This is a distinguishing feature of these interviews from those using non-positivist approaches (Marshall and Rossman, 1995). Although an objective view has been undertaken, it is recognised that error and bias may be introduced by the observer due to cultural variations (Little, 1991). It is suggested however – and this is partially confirmed by feedback given from participants and the willingness and interest in this research afforded by other professionals, that a cultural understanding exists between the researcher and participants. As both researcher and participant share similar professional

qualification's, engage with construction projects from a managerial aspect and have similar civil engineering tacit knowledge background, the emotional dependence upon one another (recognised by Earley, 1997) can logically be equalised. The researcher's phenomenological culture should match the interviewee's phenomenological background giving observations a positivistic approach.

With this research, the positivistic approach uses interviews as an extension of evidence gathered from the questionnaire process. This has been useful in gathering 'stories' from participants experience in order to understand responses made to the questionnaire. The purpose is to collect qualitative data and try to recognise and understand why a participant believes a particular opinion and has constructed a specific view. In keeping with a positivistic approach, interviews have been conducted to the following standards:

- Interviews have been held in the relevant supplier or employer organisations offices – so participants are in familiar surroundings but can be interviewed uninterrupted and in confidence
- All participants have been supplied with an information sheet which outlines the boundaries of the research, the purpose of the interview and how it fits with the research
- All participants have been issued with a statement of confidentiality, how the evidence is collected and what will happen to results
- Standardised open ended questions have been selected to reflect specific interests of this research. All interviewees have been asked the same questions, in the same order and linked to the research questionnaire.

A copy of the interview schedule together with questions asked is shown in Appendix 6.

10.3 Sample size of interviews

Following receipt of questionnaire responses, 10 structured interviews were randomly selected from those who offered to participate. Although this only represents 5.6% of the total estimated population and 10% of questionnaire responses, reference to published studies indicate that sufficient qualitative data saturation can be achieved from small numbers with close sociological groups. In

phenomenological studies, Creswell (2003, p64) suggested that five to twenty five interviews are sufficient and this was confirmed by Morse (1994, p225) who recommended at least six. Guest *et al* (2006) felt that saturation could occur with less than ten in-depth interviews, provided that a structured interviewing technique is used that clearly defines the boundaries of the research subject. Guest *et al* (2006) also explained that a researcher could detect when sufficient data saturation had occurred due to the same responses being received from participants during the interview period.

All interviewees had knowledge of both traditional and framework procurement methods and fulfilled profiles of a sociological class as construction professional managers from both client and supplier organisations. A review of interview transcripts was undertaken after five interviews using a pilot of QSR software program NVivo 9.2. Correlation of themes from responses given at that point indicated that saturation of views had been obtained with the major interview questions, but five further interviews were undertaken to confirm and provide a deepened understanding of views.

10.4 Interview investigation

An interview investigation for this research follows guidelines suggested by Kvale (1996, p88) by presenting seven stages of operation:

- An interview theme – centred around a research subject of discrete verses framework agreement projects to provide a deeper understanding of participants responses at questionnaire stage
- Design of interview questions to allow open responses from participants to collect the significant tacit knowledge available.
- Conducting the interviews in accordance with Anglia Ruskin University research ethics guides and to professional standards expected when engaging with highly experienced construction managers. A reflective approach is used to gain the knowledge sought.
- Data collection is recorded from oral responses by digital dictaphone and transcribed into MS Word written text. Transcription has been undertaken by an experienced copy typist used for accuracy of recording. Transcriptions

include hesitation remarks and the like, as these form psychological markers of an individual's thought process.

- Analysis is by use of specialist software for qualitative research through coding and nodes/themes to provide correlation of data.
- Verification of the individual interview findings are examined by comparing group results for consistency with the node/theme process.
- Reported findings are presented through aggregated views of the sociological group.

10.5 Interview structure and data collection

The structure of the interview comprised four distinct sections. Section one (closed questions 1 and 2) gathered information from participants regarding organisational background and profession, and number of years experience within the industry. Section two (closed questions 3 to 5) explored technical context by asking engagement knowledge of frameworks and traditional engagement methods. A check for bias is provided through involvement with marking or supplying information for key performance indicators. The main body of the interview at section 3 comprised questions 6 to 17 inclusive and question 19. Questions concentrated upon views regarding drivers of timescales (Q6, Q7, Q8 and Q9), drivers for stronger/closer relationships (Q10), longer relationships (Q12), completion of right first time (Q11), use of KPI's (Q13, Q14), risks (Q15), communication (Q16), financial control (Q17) and incentives (Q19). All questions in section 3 were open ended but questions 9 to 17 and 19 required two stage responses – initial views or opinions followed with a deeper justification of why a participant holds such views. Section four of the interview structure provided a single closed question (Q18) – should framework agreements be used in the future.

A copy of the interview schedule together with questions asked is shown in Appendix 6. Transcription of interview responses is included in Appendix 11.

10.6 Interview transcription analysis

Analysis of interview transcriptions involved transferring all MS Word files into specialist software specifically designed to correlate information from qualitative data. A database was constructed within NVivo version 9.2 produced by QSR International Pty Ltd (Australia). The database placed all data within an ordered structure so that analysis followed a systematic approach where themes could be detected and aligned between responses.

Individuals' responses are aligned to reflect questions posed by the interviewer – but the underlying aim of an interview procedure is to elicit views, knowledge and experiences of the interviewee concerning the research subject. Although contained within a structured set of questions posed to all, participant responses were unstructured allowing views to be freely given. Interviewees are encouraged to state their views without restriction with interviewees have no prior knowledge of the questions. This is a deliberate tactic to gain honest and forthright responses on the 'spur of the moment'. Resultant transcription text reflects this – psychological markers reflect participant views and progressive thought patterns as interviewees use their knowledge to reply to questions in a logical fashion. Transcriptions are gathered together for the ten interviews to represent a sociological class group view. Analysis is conducted as a whole from transcripts in order provide a holistic view of the case study research.

The transcript is as recorded and a cursory initial examination of responses reveals lucid and thoughtful views. All participants are post-graduate educated individuals and therefore are highly conversant with technical language allowing engagement with complex conceptual matters. In addition, all share significant experience of working within the sector and are prepared to give forthright and honest answers with logical justification to support their opinions. A summary of interviewees is contained in Table 10.1.

Table 10.1: Summary of interviewees

Interview number	Organisation	Profession	Gender	Experience (years)	Knowledge of frameworks or discrete
1	Contractor	Engineer	M	37	Both
2	Client	Engineer	M	22	Both
3	Client	Engineer	F	10	Both
4	Client	Engineer	M	32	Both
5	Client	QS	M	28	Both
6	Consultant	Engineer	M	32	Both
7	Client	Engineer	M	8	Both
8	Contractor	Engineer	M	30	Both
9	Client	QS	M	30	Both
10	Client	Engineer	F	12	Both
				241 years	

10.6.1 Word frequency analysis

The primary method to detect collective sociological group responses cumulated from individual interview transcripts was through use of Nvivo word frequency analysis. The program was enabled for word frequency search but set using a lexicon approach used to collate words with similar meanings. Deletion of 'stop words' such as conjunctions and prepositions completed the filtering process leaving meaningful descriptive text for aggregation. The remaining text is displayed as a tag cloud diagram shown in Figure 10.1.



Figure 10.1: Tag Cloud diagram displaying transcription frequency

Figure 10.1 shows the most frequent 100 words listed alphabetically from a total word count of 26,710 (excluding 'stop words'). The display is scalable according to font size with larger fonts representing higher frequencies. The use of word frequency analysis allows graphical representation to identify cumulative views of interview responses. Whilst word frequency naturally identifies respondents to the questions being posed and these are represented by words such as *about*, *because*, *framework*, *good*, *know*, *project*, *start*, *think*, *time*, *work* and the like, it also provides a commonality of views from themes such as *performance*, *relationships*, *incentives*, *encourage(ment)*, *communication* and the like.

Initial conclusions that may be made from the group response following word frequency analysis are:

- Filtering of stop words indicates a high level of considered responses as remaining words are close grouped with appropriate use of technical language.
- The most frequent 100 words are closely arranged into a relatively small number of themes which indicate a high correlation between individuals.
- As the results are closely arranged it can be assumed that interviews were consistently applied and questions understood by participants.

Confidence from word frequency analysis allows a secondary stage of qualitative investigation to be undertaken.

10.6.2 Nodes, classifications and free coding

Examination of interview transcripts along with word frequency allows construction of node creation from key statements made by participants. For example, the node of *communication* arose because it appeared in the word frequency analysis and formed a significant response from an interviewee. NVivo 9.2 was used to highlight the node and the text concerning *communication* together with the extent measured by percentage of overall response. Coding of all of the transcriptions allows frequency of themes to be aggregated and compared to total response values. Initial coding adopted a free node approach (where no connections between themes were recognised) as a first pass of analysis. An example of free coding for interview number 1 is shown in Figure 10.2.

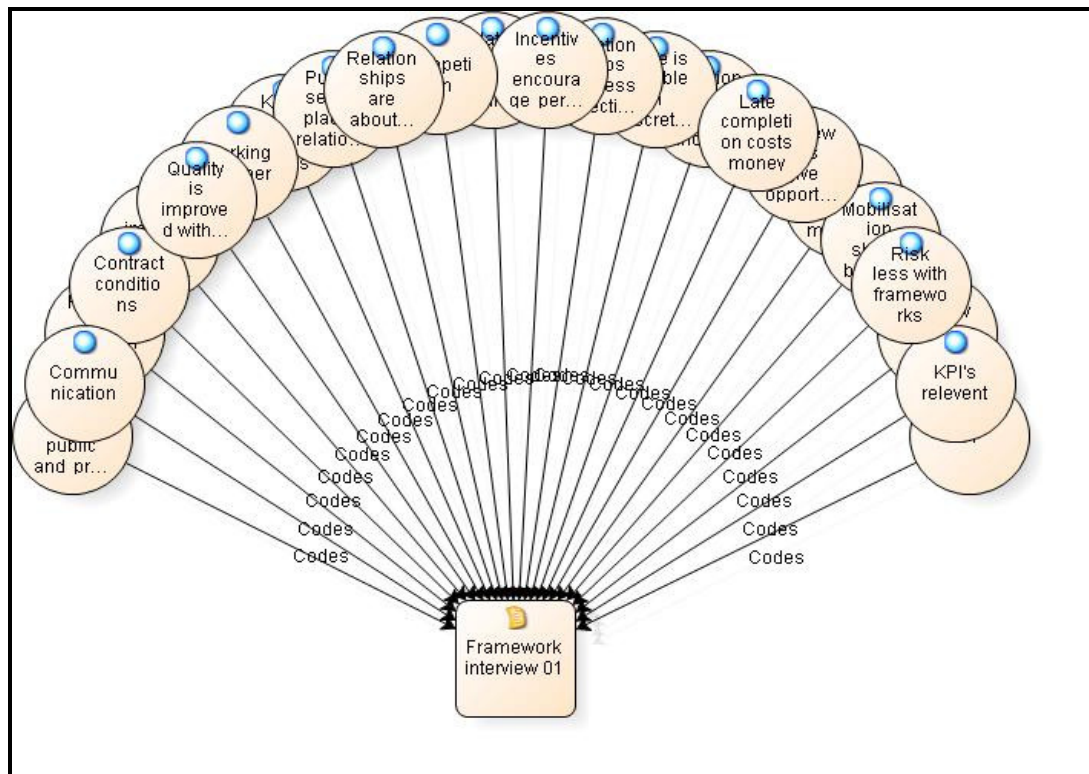


Figure 10.2: Free node coding for interview 1

The same procedure was repeated for all interviews in turn using a free node approach with results combined into a coding stripe analysis where text similarities of responses could be viewed. Common themes are detected from individual responses but a group view is required of this research. A concentrated view is combined at Figure 10.3 where graphical outputs of all individual interview transcriptions are grouped to represent those of the whole sociological class.

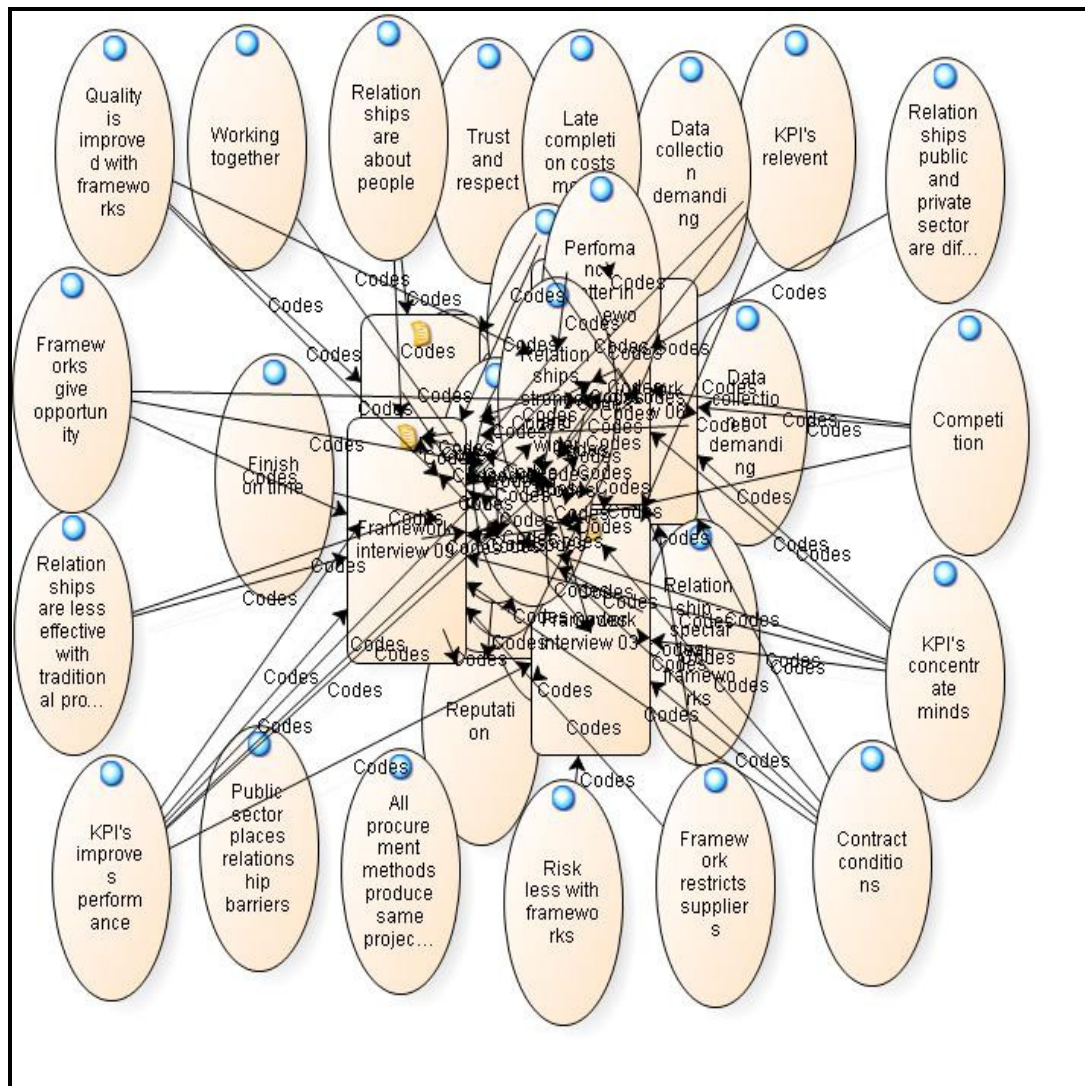


Figure 10.3: Group node collection showing concentration of responses from whole sociological class

10.6.3 Thematic analysis: connections between nodes and construction of group themes

Figure 10.3 shows group aggregation of free nodes arising from coding from all interview transcriptions. Aggregation of free nodes allows common themes to be discovered by the examination of the number of connections between nodes and mass of data clustered around particular nodes. In Figure 10.3 statements made by interviewees and coded as significant (that is, recognised as responses to the interview questions) are shown within ellipse diagrams with attached node symbols. Multiple nodes (those that are recognise significant response on multiple occasions) are centred in diagram 10.3 with connections to similar themes. Nodes which share

Examination of the connections between nodes displayed in Figure 10.3 show a parallel strength of correlated themes to those discovered through word frequency analysis at Figure 10.1. Themes of performance, relationships, incentives, encouragement, communication and the like are again at a fore.

Figure 10.4: Sorenson's Coefficient three dimensional output of relationships between nodes

10.6.4 Thematic analysis: cumulative aggregation coding frequency values

Examination of themes identified through a combination of word frequency, group node collection and Sorenson's Coefficient is accompanied by percentage values of content. Output of each interview is classified in Appendix 12, summarised in Appendix 13 and aggregated to form a cumulative group score at Table 10.2.

Table 10.2: Aggregation of coding results for all interviews

Coding summary - aggregation of results													
Node	Sub-node	Interview 1	Interview 2	Interview 3	Interview 4	Interview 5	Interview 6	Interview 7	Interview 8	Interview 9	Interview 10	Aggregation	Frequency
Contracts	Procurement costs the same	4.00									3.44	7.44	2
Contracts	Competition	7.20	1.49		1.28		1.15					11.12	4
Contracts	Contract conditions	3.70		4.72		4.53	4.53	3.59	11.12	5.36		37.55	7
Contracts	Finish on time		3.50									3.50	1
Contracts	Late completion cost money	4.30				2.90	5.14	3.54	3.51	1.69	6.15	27.23	7
Contracts	Risk balance		2.60		3.58					1.82		8.00	3
Contracts	Time variable with discrete	0.40										0.40	1
												95.24	25
Frameworks	Frameworks restrict suppliers						7.99			4.03		12.02	2
Frameworks	Frameworks give opportunity	2.30				2.65	2.25			5.59		12.79	4
Frameworks	Framework unique	2.20	2.80			0.65						5.65	3
Frameworks	Quality improved frameworks		1.00		1.32			4.23				6.55	3
Frameworks	Frameworks performance better	4.70					6.06		3.27	1.97	2.17	18.17	5
Frameworks	Frameworks improve quality	6.20										6.20	1
Frameworks	Risk less frameworks	1.40		0.75								2.15	2
												63.53	20
Operations	Data collection demanding										3.18	3.18	1
Operations	Data collection not demanding					1.73	7.05	3.20	1.38			11.63	3
Operations	Finances controlled	0.80	2.58	0.63		0.32		4.43	1.19			9.93	4
Operations	Mobilisation sufficient											1.75	3
												26.49	11
Performance	Incentive encourage performance	1.70	1.40	3.60	3.20	4.85	4.87	16.66	9.18		4.69	50.15	9
Performance	KPI concentrate minds	0.80	2.20	2.77	0.86		3.50		1.73	3.38		15.24	7
Performance	KPI's improve performance	0.80		2.40	2.10	4.55	3.50	2.87	1.08	8.11	5.84	31.25	9
Performance	KPI's relevant	2.90	1.78	3.20					2.21	3.39		13.48	5
												110.12	30
Relationships	Behavior		2.10	2.70		2.18	4.54	2.94	0.79			8.01	4
Relationships	Communication	1.12	4.42		2.17	7.39		14.96		4.69	7.00	48.99	9
Relationships	Public sector places barriers	7.40										7.40	1
Relationships	Relationships special frameworks	8.80	2.64	3.91	1.04			3.95	2.44	4.24		16.39	4
Relationships	Relationships people	1.00										11.63	4
Relationships	Relationships less with traditional	4.80				3.87				4.94	4.11	17.72	4
Relationships	Relationships public private differ	2.40			1.78							4.18	2
Relationships	Relationships stronger wider	3.99		1.85	2.26	1.69	9.36	7.55	4.19	2.32	5.14	38.35	9
Relationships	Reputation		2.50	0.90		0.40	0.98		5.19	2.66	2.24	14.89	7
Relationships	Trust and respect								0.81			0.81	1
Relationships	Working together	3.10		2.30					0.79			6.19	3
												174.56	48
		76.01	31.01	28.73	19.59	37.71	60.92	67.92	48.88	54.21	43.96		

10.6.5 Thematic analysis: hierarchal structure of interview responses

Principal nodes from themes generated in Figure 10.3 are supplemented by sub-nodes arising from the coded transcripts in Appendix 13. Each coded sub-node is accompanied by a percentage value which represents the extent of text attributed to each subject.

Values allow a hierarchy to be established – with culmination of percentages and frequencies linking nodes. Figure 10.5 shows a structured node tree constructed using empirical values calculated from Table 10.2. Figure 10.5 show connections between nodes placing highest value as a primary node. Secondary and tertiary nodes follow order allowing a tree to be constructed. Figure 10.5 is a graphical representation of Table 10.2 but has additional information from connections identified in Figure 10.3. So a theme of *relationships* is determined as the prime node due to the highest ordered value. Sub-nodes of *relationships* are determined by the same process. A node tree diagram also identifies free nodes – those with no connection to others. Figure 10.5 does not exhibit any free nodes.

Figure 10.5 only displays aggregated codes in excess of 10 from Table 10.2 representing 0.02 significance out of a total of 469.94 coding aggregation. Colour referencing has been used as follows in Figure 10.5:

Aggregated themes = < 25 - blue

Aggregated themes = > 25 < 50 - red

Aggregated themes = > 50 < 100 - amber

Aggregated themes = > 100 - green

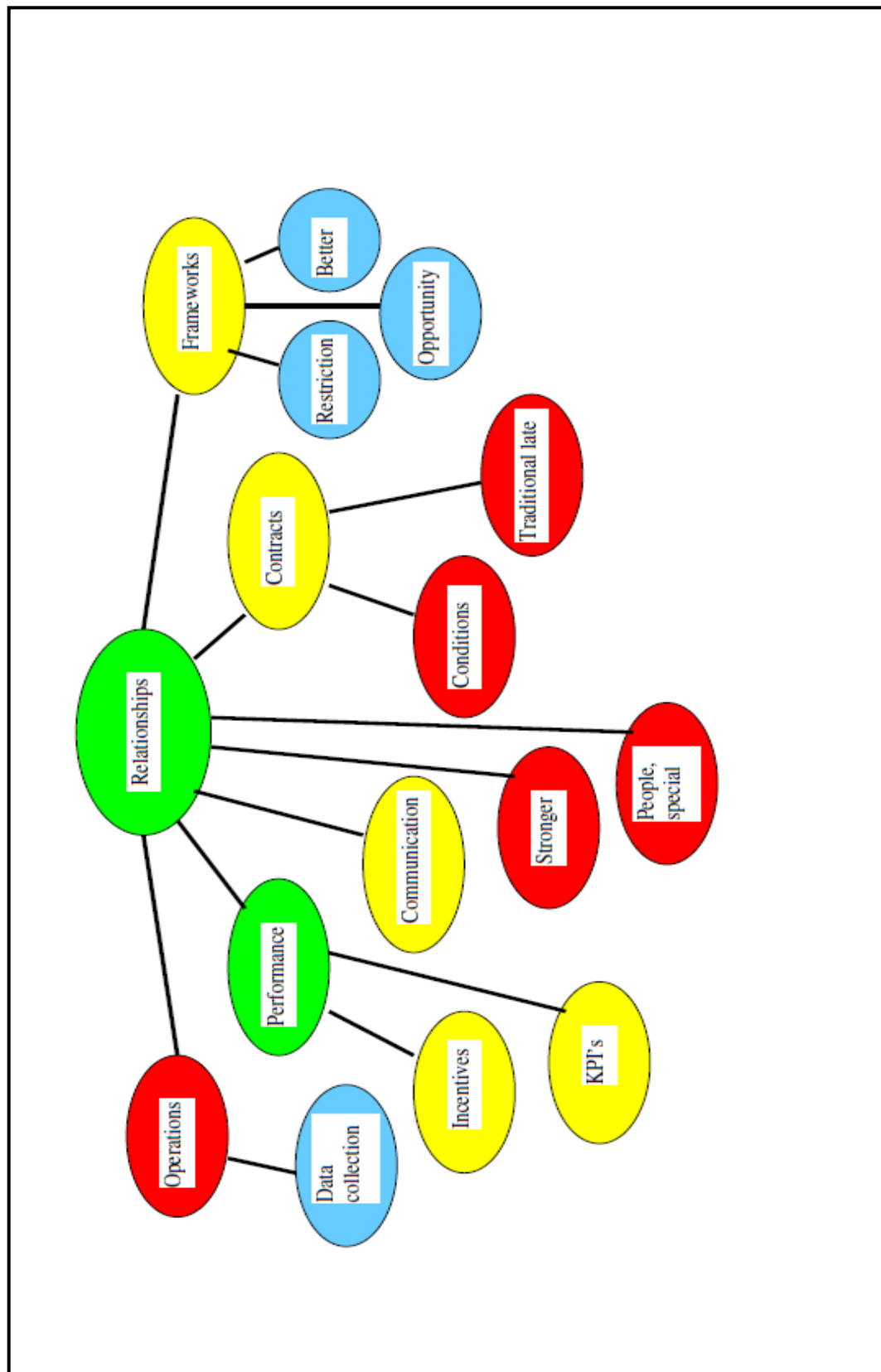


Figure 10.5: Structured node tree showing hierarchal results

10.7 Qualitative meta-synthesis: examination of results within the context of interview responses

Results from thematic analysis uncover an interrelated number of key results (or themes) that can be placed according to frequency into a hierarchal structure. Aggregation of results allows the strength of a theme to be measured within the sociological group, as a higher value indicates stronger affirmation to that theme. The final stage of interview analysis is through ‘third order interpretation’ (Britten *et al.*, 2002; Campbell, *et al.*, 2003) where review judgement is placed against the questions posed. Such interpretation requires a cyclical process where answers are gauged against questions and strength of response recorded. The process is repeated against a context of hierarchy until conclusions are reached. It is recognised however that qualitative synthesis ‘*involves some degree of innovation, or employment of concepts not found in the characterisation of the parts and a means of creating the whole*’ (Campbell, *et al.*, 2003, pg 672).

To provide a control of meta-synthesis, a matrix table was devised in Table 10.3.

Table 10.3: Meta-synthesis matrix from interview results and responses

Interview question theme	Participant response theme	Strength of response	Inference
Q6 – Drivers for starting on time – project time outcome	Key performance indicators, motivation	Medium	Division in views between KPI's, reputation and contract requirements
Q7 – Encourage finishing on time – project time outcome	Contractual requirements, motivation, incentives	Medium	Division in views between contractual requirements and financial incentives
Q8 – Start and finish on time – project time outcome	Long term relationships through joined projects	Strong	Understanding of working together and continuity of teams
Q9 – Framework start and finish more than discrete – project time outcome	Long term relationships and performance monitoring	Strong	Performance is higher with framework agreements but

			must be linked to incentives and part of cultural paradigm
Q10 – Stronger closer relationships – overall project outcome	Respect, team working, longer relationships, satisfaction	Medium	Division in views regarding the procurement method
Q11 – Drivers right first time – project quality outcome	Joined contracts, performance monitoring, communication	Weak	Range of views regarding procurement and drivers
Q12 – Procurement methods longer term – overall project outcome	Longer term relationships, knowledge of working together	Very strong	All 10 participants decided framework procurement
Q13 – Use of KPI's - overall project outcome	Performance, incentives, joined contracts	Strong	Participants recognised the use of KPI's but less so with linked projects
Q14 – KPI data worthwhile/demanding – overall project outcome	Performance, motivation, incentives, satisfaction	Strong	All participants felt KPI's worthwhile, but collection ranged from not at all to demanding
Q15 – Framework risk allocation – overall project outcome	Contract mechanisms, relationships	Weak	Contractual mechanisms dominate diverse views
Q16 – Communication, discrete verses framework – overall project outcome	Communication, relationships, mechanisms	Medium	Views range but frameworks just predominate, other factors are stated
Q17 – Financial control discrete verses framework – project cost outcome	Adversarial, relationship, communication	Medium	Frameworks and conditions of contract are recognised
Q18 – Continue	Performance,	Strong	All

frameworks – overall project outcome	relationships		participants decided affirmative, with a range of suggested amendments
Q19 – Incentives in frameworks worthwhile – overall project outcome	Incentives, performance	Very strong	All participants decided affirmative, but views contrasted between financial and reputation metrics

Use of meta-synthesis allows capture of qualitative data from the sociological group through examination of themes and strength of views leading to inference conclusions. The themes recognised through this process and shown in Table 10.3 centre around performance, contractual mechanisms, incentives, communication, relationships and the like. Strong socio-psychological drivers appear recognised by participants of the interviews as anticipated by the model. Strength with responses varies according to views - strong responses correlate with all participants offering succinct views whereas weak responses are dispersed with varying causes. An overall inference from meta-synthesis for this research is discussed at conclusions of this chapter.

10.8 Significant qualitative statements from participants

Opinions and views form an important element of sociological trends because these represent individual psychological empathy which may affect team performance. As proposed by Cresswell (2003), attitudes and opinions generated through a population will be gathered through a sample of that population. A quantitative sample may be obtained through interviews in response to questions posed in a face to face situation. The importance of obtaining qualitative data – particularly from experienced construction professionals – cannot be underestimated. George and Bennett (2005, p.20) suggested that use of quantitative methods in isolation does not allow researchers to get as close to phenomena as those adopting case study methods. Their

reasoning is that a structural researcher is less likely to be corrected by data ‘talking back’ - something that happens frequently with a case study interview. This view was supported by Mintzberg (1979) noted *‘we uncover all kinds of relationships in our hard data, but it is only through the use of this soft data that we are able to explain them’*.

An opportunity to gain views from participants with significant levels of construction management experience engaged through the interview process is used to illustrate soft data from participants.

10.8.1 Views upon strength of relationships

Analysis of statements from interviews provided significant comment about closer and stronger relationships of frameworks. A Managing Director for a regional supplier stated:

‘I think the participation to the framework from all members does encourage a stronger and a closer relationship because you are participating together and as a result you create more common goals and have a key working approach. I don’t think had Winchester High Street been secured outside of that framework....that the outcome potentially would not have been as good. It’s just like saying you get a good relationship between ourselves as employer and contractor because we’re familiar with each other. Similarly, exactly the same applies from the point of view of your own labour or subcontractors. I mean, a framework is four years and when you participate in a framework that by its very nature is a long term relationship. Conversely, if you go back to traditional procurement that may or may not achieve the same relationship.’

On a similar theme, a Senior Engineer with the Client organisation said:

‘I think for the traditional methods, there’s a sense of a lack of accountability, you know, to perpetuate the relationship which means they might be being extremely more self focused and self servant. Whereas with a framework, there’s still a need for flexibility between one contract to the next because it’s done in a relationship environment where there’s negotiation and discussion which takes place.’

Support for longer term relationships through frameworks is also recognised by commercial managers by the thoughts of a Senior Quantity Surveyor from the Client organisation:

'All of that improves an understanding and I think that obviously um helps the relationships in some cases. Obviously not all the time. We obviously know that there are a lot of people out there that it doesn't matter what you do, you're still going to be in the same boat at the end of it but generally I would say that the framework is better for building relationships. Obviously the flip side of the coin for the contractor is they're looking at secured future work. And that's what they're after. You know, guaranteed workload over the next sort of three or four years.'

A Managing Director from another supplier confirms that:

'The framework does encourage longer term relationships. I mean it stands to reason really that people have got more time to understand each other and build up trust and build up understanding more than anything. Well obviously if there's a continuous work programme that people will be together more often (from the client and contractor side, and the supplier chain), then inevitably there's going to be relationships built up and better communication and that's more likely to happen in a framework because of the strong relationships.'

10.8.2 Views upon performance, incentives, motivation, communication and reputation

During the interviews a number of themes were interrelated. The conceptual model included in this research identified incentives, motivation, satisfaction and relationships as key drivers toward performance improvements. Relationships have been clearly recognised by interview participants as a key driver. The other three suggested drivers are suggested by context. As a Managing Director for a supplier states:

'...and I think the way you've set up the framework has been quite nice in that it's been a carrot and stick approach. I think you know, that's the right approach. I think you achieve probably, the best outcome by that. So I think that you do definitely get better performance. I look at the framework in comparison to how our relationship was previously and I think our communication has improved. I think there's no doubt

about that and I've touched on that a number of times already I think that the framework delivers good value for money to Hampshire County Council because it retains genuine competition and you know, I'm a great believer in retaining competition. I think that's one of the things that I think sounds odd coming from a contractor, we usually want as little competition as possible. But the reality is at the end of the day, that we always perform very well when we're in competition because we're a league organisation and therefore I think that competition delivers good value for money which I'm glad to say has become more on the agenda in the last couple of years because of this financial circumstance in which we find ourselves...'

A Senior Engineer also suggests incentives as motivation for performance:

'...especially if they're in the public eye with performance data being published, let's say that they will stick to something. And as a social benefit its good. It's a marketing thing to be able to say "look, we finished this ahead of said schedule". Like with the drivers, they encourage projects through the quick communication and inclusive behaviour. I think that inclusive behaviour is to do with involvement. The framework has a definite encouragement towards longer term relationships just by the fact that they are a longer term contractual relationship. I think, and clearly again the traditional ones use shorter relationships because there is no connection between each project. So I think the new challenge of parties actually stretches beyond that of a framework because at the end of the day you could have a relationship for the duration of your contract as well. These challenges will extend beyond the contractual relationship because they include additional elements beyond the contract such as site welfare. The mechanisms in the framework allow, you step out the back of the project and quickly within a week agree the final account saying ok and look away. And to my mind that's just incredibly efficient. I mean I think that's especially impressive with the framework as opposed to the traditional contracts Yeah, definitely I think... I mean incentives... I think it improves relationships, better working, I think it stands to reason. Suppliers are rewarded with incentives from performance and they are benefiting from that.'

Incentives and motivation are particularly noted by commercial minded participants such as Quantity Surveyors:

'I think that fact that the KPI system is inherent within the frameworks (whereas they're not in our stand alone contracts), means that the contractors are always looking to improve their delivery. You know, if he knows he is going to be marked down, he's always happy to make that extra effort. And that will affect his attitude towards starting, finishing, and you know, sort of lots of things in between. You don't necessarily get that on stand alone contracts because, you know, there's no real reason.'

'the more you work with a contractor the more you get to understand the way they work, how they price the work, the key staff, what you expect from them, and how you want the final account to be presented and agreed. They enable both sides to look at historical performance data related to the project to identify where the client team and the contractor team members need to improve. They encourage contractor teams to perform strongly in a chosen area, to gain repeat business, and to not be penalised.'

Regarding incentives – this statement from a participant is noteworthy because non financial incentives are also important to suppliers:

' actually there is a social side of it. They're mostly always in the green, but if one of them drops to amber they all know about it and there's a little bit of a loss of face for them. So there's a sort of peer pressure in a way to help them keep performing. And that's a really positive thing because it does mean that they are concerned about their service and they are actively engaged in maintaining it.'

10.9 Summary of qualitative data and connection with hypothesis

The introduction of this chapter stated that the purpose of the interview process was to capture information from sociological group case study participants. Shared views of a sociological class represent the culture of that group (Levine and Moreland, 1991) and use of this theoretical basis provides a method to elicit themes from participants.

Qualitative methods selected for analysis of interview transcripts comprise word frequency, node theme classification and meta-synthesis in order to elicit individual participant statements and these are aggregated into group views. Interpolation of the aggregated group views are designed to represent predominant views of the sociological group class provided that saturation has occurred (Guest *et al*, 2006).

Aggregated coding results in Table 10.2 and structured node tree in Figure 10.5 displays a commonality with clusters allowing group views to be summarised.

Primary theme of the research interview centred on participants views regarding the drivers of performance and particularly those that affect project outcomes. A secondary theme determines if participants detect any difference between discrete and framework agreements in terms of performance outcomes. Results from the qualitative analysis allow a discussion upon the proposition made by hypothesis H6:

H6: Performance outcomes are positively associated with sociological factors (behaviour factors) and operational factor (performance measures).

Analysis from factor analysis results in the previous chapter provided a significant component with high factor loadings for incentives, decision making, relationships, trust and knowledge transfer. The factor, labelled *duration*, required a continuance of passage of time with which to gain performance outcomes. A measure of central tendency found three behaviours (relationships, trust and motivation) that aligned with strong factor loadings.

Confidence with the questionnaire provided a basis to explore participants views further through a semi-structured interview. A structured node analysis, using aggregated coded results from the interview transcriptions identified the hierarchy of responses. Use of this method allows group views to be compiled from individual interviews. The most significant theme concerned relationships, where successful ones improve performance and is operated through incentives (either financial or psychological). The performance node also includes operation of KPI's as part of performance measures. A sub-node to relationships is communication – where aggregated responses had values in excess of 50 for operational factors with contracts (measurement process) and frameworks (performance process). Sociological behaviour was recognised as being more effective than financial rewards as suggested by Thibaut and Kelly (1959) in *The Social Psychology of Groups* and expanded through a general independence theory by Rusbult, Martz and Agnew (1998). The case study interview results align with this published research as participants recognise satisfaction of sociological needs and rewards more readily through framework arrangements when contrasted with discrete methods.

Within the generalised view, individual components – described by practitioners through their own words in response to interview questions – provide a significant awareness of the drivers of performance. A summary of practitioners own views regarding sociological and operational factors are:

- *{Sociological factors} ...encourage a stronger and a closer relationship because you are participating together and as a result you create more common goals and have a key working approach*
- *{Sociological factors afford} ...better communication and that's more likely to happen in a framework because of the strong relationships*
- *{Operational factors} ...are rewarded with incentives from performance and they are benefiting from that*
- *{Operational factors} ...enable both sides to look at historical performance data related to the project to identify where the client team and the contractor team members need to improve.*

The extent of this is perhaps surprising given the traditional conservative views of the construction industry (Davies, 2008) and realisation that case study participants had less than three years experience of framework agreements at the time of interview. Coupled with a natural resistance to organisational change proposed by Smollen, 2011, the strength of results and engagement of participants with drivers of performance is somewhat significant. A proposition provided by hypothesis H₆ is confirmed.

The interview results indicated that project time (start and finish on time) was positively associated with relationships drivers, works quality (right first time) was positively associated with motivation drivers, and accuracy of project payments was positively associated with communication drivers. A proposition provided by hypothesis H₆ is hence validated that project outcomes are positively associated with relationship, communication, incentives and performance review of the KPIs.

CHAPTER 11: OVERVIEW OF VALIDATION OF HYPOTHESES AND PROCUREMENT PERFORMANCE MODEL

11.1 Introduction

This chapter undertakes a validation review of hypotheses and procurement performance model from a philosophical perspective by examining the deductive and inductive processes providing a reflection of methods used by this research. As stressed by Law (2007), methods of validation will depend upon the specific purpose and contextual positioning of the research, with further views provided by El-Diraby and O'Connor (2004) who felt that '*no single definition of the ingredients or subsets of the concept of validity*' exists. With this in mind, validation of the results uses accepted techniques applied to construction research. These principally consist of internal validity which reflects upon performance differences, causality and derivability of relationships (Leedy and Ormrod, 2001) within the case study of Hampshire County Council. This process is particularly important for a theory for improvement of the professional practice in use and management of framework agreements. External validity involves testing of the results across other public sector construction management organisations so that they become more robust, and further research is recommended to achieve this purpose. Nonetheless, reproduction and replication of results is suggested to be available due to the nature of public sector authorities and their similar structural composition (Brinberg and McGrath, 1985). During the validation process, engagement of accepted theories and published information specifically with professional practice is a reflection of the nature of this thesis.

11.2 Validation of Group A Hypotheses

Group A hypotheses involved an introspective examination that focussed upon measurement and analysis of project outcomes. The group comprised two interlinked hypothesis proposing that operational methods offered by framework agreements would produce a measurable difference in critical success factors (H1) and a project success index (H2).

Construct validity was provided through engagement with external sources for published research into critical success factors (CSF) and a project success index. Recent publications provided a basis for determining the content of each CSF and aggregation into a relative project success index (PSI). Although the published research was placed in a different contextual position (Hong Kong region), outcomes of success from clients provided a basis upon which to produce values and descriptors for this research. Chosen values and descriptors for this research, following consultation with the client, are closely related to the original published studies.

Data from operational measures specifically engages with metrics supported by contractual data used with management of a construction project – e.g. start and finish dates, payment certificates and the like. This provides the second external interface and ensures that content validity represents reality.

Causality, through examination of characteristics of projects from published research allowed an investigation in variables in order to determine the effect upon results. The examination revealed that two possible variables existed – that of project size (value). The method used to determine differences in outcomes between discrete and framework engagement utilised t-tests with cross validation provided through two stages of testing. Stage 1 included all 164 projects contained by the case study irrespective of value whereas stage 2 matched 60 paired projects closest by value. Reduction of the number of projects being examined at stage 2 did not make any significance difference to the results confirming internal validity with statistical methods used (Kerlinger and Lee, 2000).

Overall results regarding the difference in critical success factors and project success indices for discrete and framework agreement methods are validated in chapter seven by the independent-samples t-tests as follows:

For H1,

- framework projects showed a significant improvement in ‘finish on time’.
- framework projects showed a significant improvement in ‘accuracy of project payments’.
- framework projects showed a significant improvement in ‘right first time’.
- framework projects showed a significant improvement in ‘health and safety’.

For H2,

- framework project showed a significant improvement in ‘overall project success’

These validation results were further confirmed by the practitioners’ views collected by questionnaire survey (Chapter 9), as outlined in Table 11.1 below.

Table 11.1: Results from questionnaire survey regarding CSF performance

Critical success factor	Discrete Method	Framework agreement
CSF1A – Which procurement method encourages the supplier to start on time?	6%	53%
CSF1B – Which procurement method encourages the supplier to finish on time?	6%	60%
CSF2 – Which procurement method allows variations to be agreed quickly?	16%	56%
CSF3 – Which procurement method produces fewer defects at completion?	4%	50%
CSF4 – Which procurement method encourages higher levels of health and safety?	18%	48%

The relationship between project outcomes and performance drivers are explained by the practitioners’ views collected by qualitative in-depth interviews (Table 10.3), as outlined below:

- Project time (start and finish on time) was positively associated with relationship drivers,
- Works quality (right first time) was positively associated with motivation drivers,
- Accuracy of project payments was positively associated with communication drivers.

Application of the validated results from this research into critical success factors and project success indices are with external interface of results with the case study organisation, central government and publication through academic conferences and professional practice journals. Publications arising from this research are listed later

in this chapter, but in addition papers regarding use of framework procurement methods have been used in strategic policy decisions at local and central government levels. Feedback from published results and general acceptance of outcomes has enabled development of professional practice stated in chapter twelve.

A holistic view of the validation process used in group A hypotheses is shown in Figure 11.1.

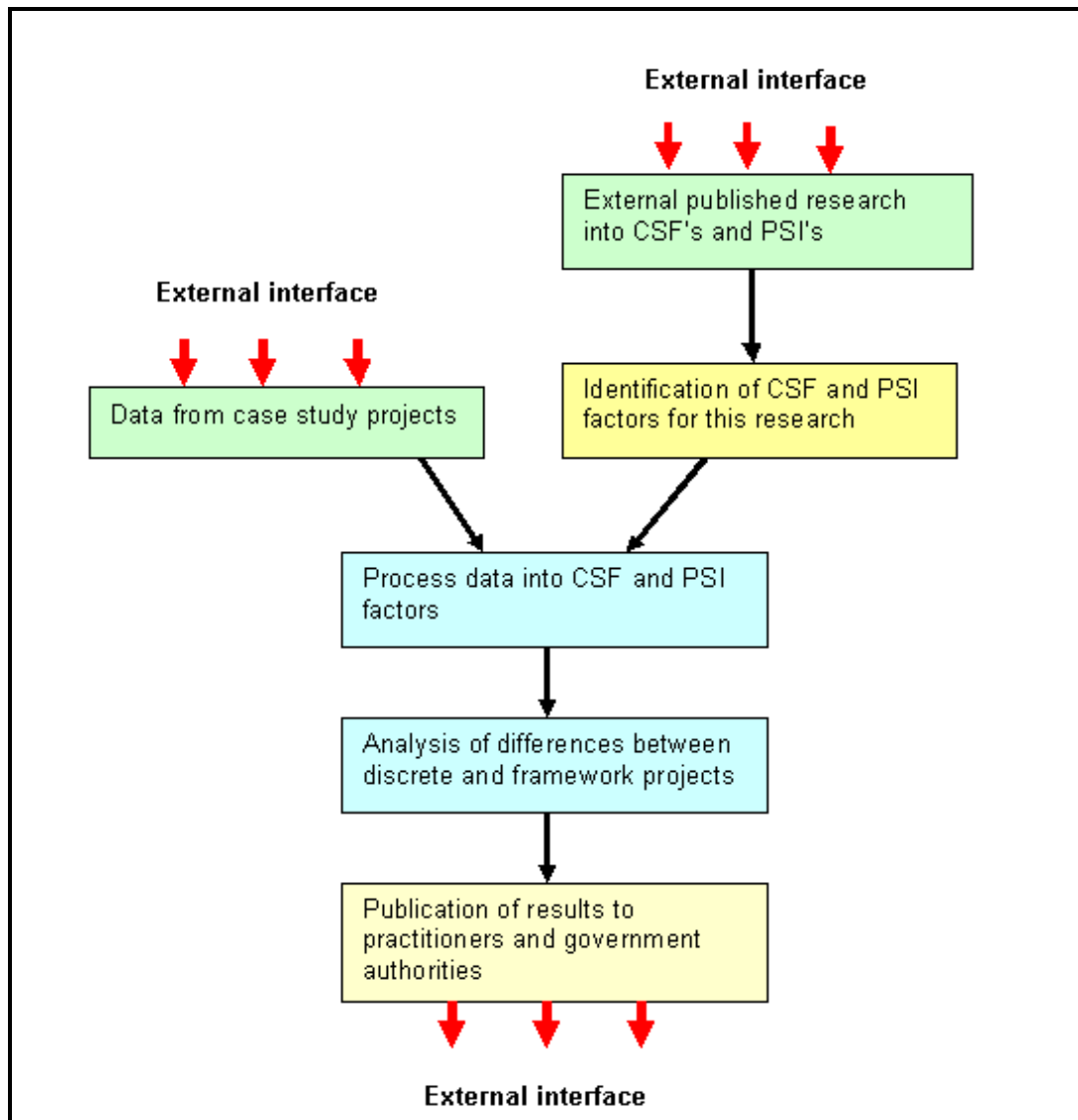


Figure 11.1: Group A validation process

11.3 Validation of Group B Hypotheses

Group B hypotheses provide an extrospective examination of economic performance with framework agreements. The group comprised three interlinked hypothesis examining aspects of financial performance concerning difference in production costs (H3), engagement transaction costs (H4) and performance monitoring costs (H5).

Construct validity was provided through engagement with external sources for general economic theory of perfect market competition, tendering theory and research into costs attributed to performance monitoring/quality. Although a significant amount of research has been devoted the study of general economic market operation, the amount discovered directly attributable to tendering theory and performance monitoring relies upon information that is difficult to quantify. Theoretical propositions from the published research guides the method used for comparison between the two procurement methods.

Data from operational measures relies upon examination of contemporary records from the case study organisation – subject to public accountability, independent scrutiny (stable financial system) and statutory standing orders. The second external interface is considered reliable with content validity, as the accounting system aligns with all public authorities, representing reality.

Unlike group A hypotheses, there are no discovered metrics with which to align costs with group B. Outcomes were therefore measured according to practice convention for public accounting procedures under standing orders. Production costs (tender values) were judged against pre-tender estimates incorporating methods of cost forecasting in line with NRM guidelines (RICS 2012) gaining causality through practice.

The two procurement methods were statistically measured against each other to detect variations of the differences in the means (t-tests) of production costs, transaction costs and monitoring costs and results judged against propositions offered by each hypothesis derived from appropriate theory. Results of the t-tests are given in Chapter 8, as outlined below:

For H3,

- the hypothesis of significant difference in production costs between framework agreements and traditional tendering methods due to reduced competition was rejected. The results indicated that there was no significant difference in production costs between the two methods.

For H4,

- the hypothesis that there was no significant difference between engagement transaction costs of the two methods was rejected. Engagement costs of framework agreements were found to be significantly lower than discrete traditional projects

For H5,

- the hypothesis that there was no significant difference between performance monitoring transaction costs of two methods was validated.

As with group A, results of t-tests concerning financial viability were not disclosed to participants and the detailed nature of inference is difficult to convey to interviewees. Instead, a generalised view regarding value was questioned at the interview stage. For comments concerning financial viability, a supplier explained that frameworks do not have significant impact on production cost and that they are still competitive because:

....you've got this continuous programming, planning, arrangement and working on both sides effects is a good environment to achieve that (supplier 08 SJ). Another states *'clearly the framework suppliers understand what Hampshire requires and have priced accordingly'* (Estimator of Na supplier).

Comments from the interviews with the Hampshire County Council managers suggested that engagement transaction costs were reduced through framework agreements due to standardisation and repetition of contract documentation and control mechanisms

Confirmation of statistical results used was achieved as differences in financial viability between the two procurement methods are detected by practitioners in 'real

life' situations (Garson, 2007). In support of the results, an action research method was used as a field trial for a project under discrete procurement conditions using a mixture of discrete and framework suppliers. Tender results confirmed financial effectiveness of framework suppliers as suggested by the statistical method.

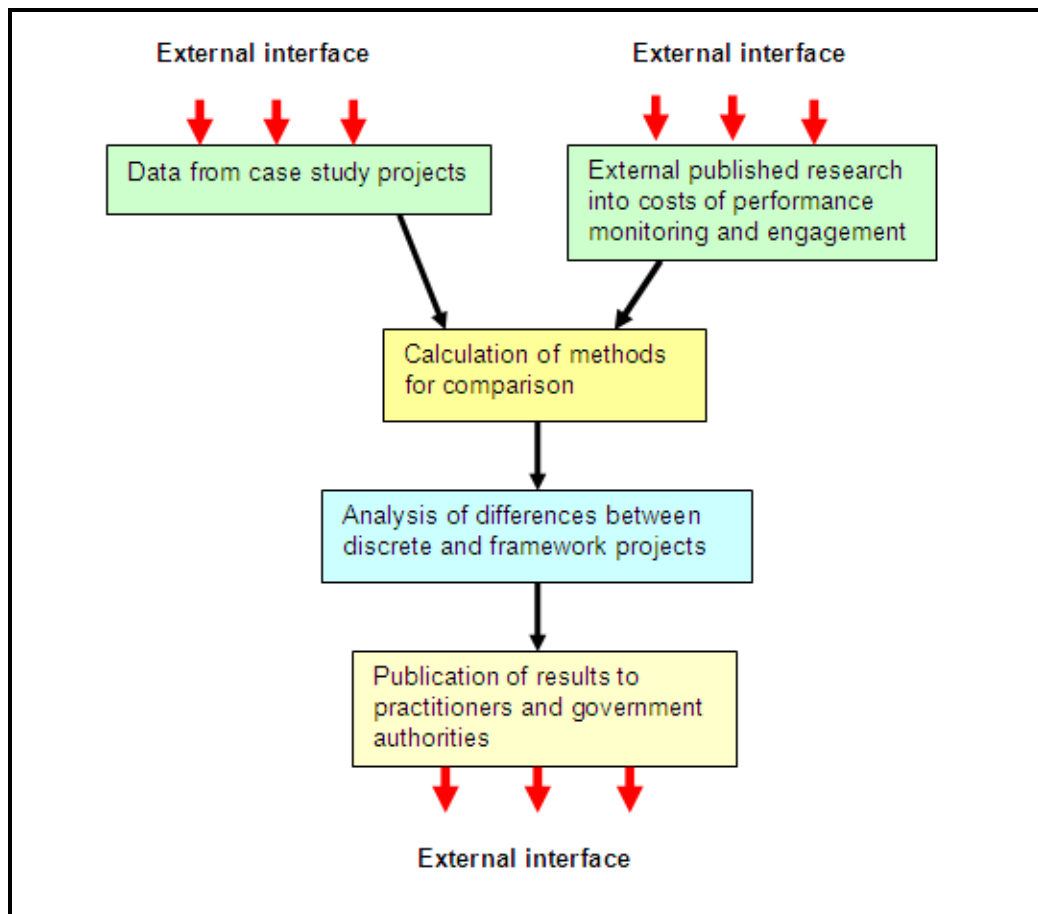


Figure 11.2: Group B validation process

Application of validated results for financial viability provided an external interface with the case study organisation, central government and through publication of results to a cost data base (BCIS, 2011). Results are used with strategic decisions for procurement of further framework agreements and development of professional practice stated in chapter twelve. An outline of the validation process for group B hypotheses is shown in Figure 11.2.

11.4 Validation of Group C Hypotheses

Group C proposes a single hypothesis which positively associates performance outcomes with sociological factors (behaviour factors) and operational factor (performance measures).

Construct validity arrived from examination of behaviours with groups of a technical class engaging with sociological group research and those attributable to high performing organisations. Published research placed behaviour factors as significant contributors to performance outcomes and cross reference between journal papers provided a focus upon the most appropriate recognisable factors for construction management groups. A pilot study was used to engage participants and confirm identification with behaviour factors.

A questionnaire survey, comprising collection of views from participants for behaviours and measures achieved a high response rate from the case study (55.6% of the total estimated population of 180 practitioners) providing content validity to group views. Face validity was attained through involvement of experienced industry professionals through the interview and questionnaire survey using structured questions to strengthen internal reliability. An examination of bias between sub-groups through scatterplots and cluster examination was undertaken prior to statistical analysis. In addition to behaviour factors, association of outcomes using performance measures were specifically tested through questions in section 2 of the questionnaire – specifically at Q6, Q7 and Q8.

Factor analysis is used to identify behaviours within the model to ensure internal consistency reliability is sufficient (Montgomery *et al*, 2001). Analysis of questionnaire results was used to extract as many latent variables (factors) as necessary to explain correlations among items (Reise, *et al*, p. 294). Two factors were discovered – labelled *duration* and *empowerment*. Both relate to long term arrangements available for framework operations, but not so with discrete procurement. Of the two factors, *duration* is significant due to an eigenvalue of 4.27. Interviews transcripts were analysed using qualitative data analysis (QDA) with text aggregation, node classification and graphical representation. Rationale of the interviews provided greater depth to responses from the questionnaire survey, where content validation is achieved through engagement with practitioners. Results from transcripts confirmed group recognition of behaviours identified through interviews

providing criterion validity of correlation – where interviews and questionnaires identified relationships, trust and motivation as common participant behaviours.

Hypothesis H5 proposed positive association between behaviour factors and performance measures. Loadings from factor analysis, central tendency from the questionnaire and significant node values from interview transcripts validated the hypothesis as below (see also Table 11.2),

The performance outcomes were positively associated with relationships, communication and financial/non-financial incentives. An outline of the validation process for group C hypotheses is shown in Figure 11.3.

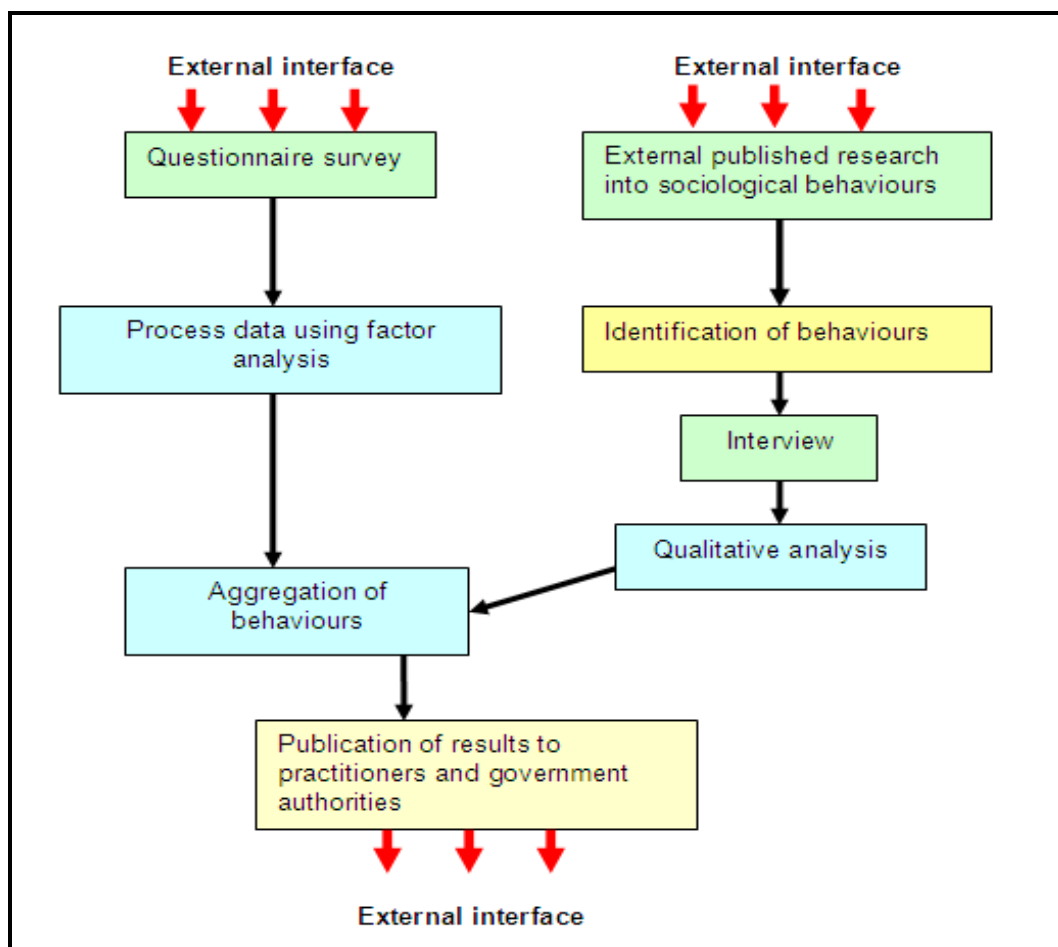


Figure 11.3 Group C validation process

Application of the validated results related to behaviour factors and performance measures is through an external interface with the case study organisation

11.5 Validation and review of Procurement Performance Model

Chapter three proposed a hypothetical procurement performance model, constructed following a literature review and pilot study with participants, into the development of collaborative arrangements in construction management and in particular those associated with framework agreements. The model was an attempt to understand relationships between participants to a framework and recognise the drivers used to encourage performance improvement.

The model consisted of three parts – performance improvement at the centre of the model, an operational construct consisting of performance measurement measures and a sociological construct of behaviours. Six hypotheses were proposed to test elements of the model and provide results that confirm or amend the hypothetical model. Operational drivers are provided through a substantial body of research into performance management and performance measurement. The model operational construct follows an established pattern of ‘measure – result – reward - improve’ (Deming, 2000) but applied to construction management.

Sociological interaction in the procurement performance model is provided through examination of ten performance drivers from published research. All ten were included with the proposed model, but four – *relationships, incentives, motivation and satisfaction* were examined in greater detail because participants to a pilot study felt these were the most significant.

11.5.1 Validation of model

Within this thesis, a conceptual model is used to explore theories connecting with and underlying the research question to assist with guidance of the research process. The performance model has been constructed using a proposition suggested by Berger and Patchener (1988, pp 156-159) by selecting and reviewing available relevant literature to construct a framework for the study. Use of concepts within this proposition recommends a graphical expression of generalisations from particulars to show relationships between words, symbols and ideas (Cohen *et al*, 2000). These concepts are used to gather expectations from the research, assumptions made from published information and theories to support inclusiveness within the model

(Maxwell, 1996). Engagement with external publications provides construct validity to the models hypothetical underpinnings.

11.5.2 Review of model

The review follows a hierarchy recommended by Punch (2000, p 23) as represented in Figure 11.4.

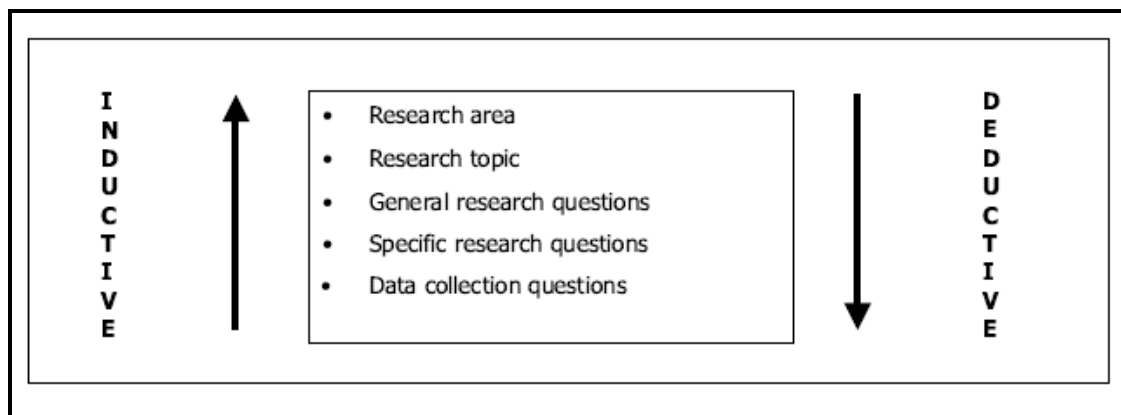


Figure 11.4: Hierarchy of concepts (Punch, 2000)

A deductive-inductive approach is used to review the performance model further.

11.5.3 Deductive review of model

Dissection of components into strategic key research questions provides the general research question, namely to verify if differences exist between the two distinct procurement methods and investigate causes that effect such differences. This provides five specific questions in the form of hypotheses grouped into impact of behaviours and organisational culture on performance and performance measurement on project outcomes. The six hypotheses provide direction for appropriate statistical analysis linking data collection with a source of data and application of methods. A view of the deductive process is shown in chapter four at Table 4.3.

11.5.4 Inductive and validity review of model

Inductive reasoning reverses the conceptual process by developing a hierarchy from the observed data. Data collected from the case study provides an interface with face validity as the raw data represents project outcomes (contractual or verified metrics), participants responses from a technical class, or transcripts of participant views. The data comprises a mixture of project outcomes (quantitative), questionnaire results (quantitative or qualitative views) and interviews (qualitative). The data source is used to investigate specific research questions by alignment with individual hypotheses. Appropriate methods, using a comparative approach with other construction management research (identified with hypotheses validation previously), provides construct validity to the results.

Significant inclusion with experienced practitioners of views allows the results to reflect tasks, activities, events and environmental factors representative of professionals generally occurring elsewhere. Although the case study may provide limitations to this, content validity is provided through participants wider experiences elsewhere.

11.5.5 Discussion from reflective analysis of performance model

Graphical representation of the performance model reflected origins constructed from published literature allied to the research topic. Two significant elements arose from the literature review identified from characteristics of high performance organisations (Akedemir *et al*, 2010) – an operational construct reflecting performance measurement research and a sociological construct recognising group performance methods from psycho-sociological studies – centred on the framework agreement.

Reflective analysis of the model indicates a strong association with each significant element. The operational construct relied upon use of key performance indicators to measure project outcomes where successful projects could place suppliers for selection of a future project by use of a marginal incentive system related to price and quality assessment. Operation of the construct gave a measurable improvement in project performance outcomes (discussed further in chapter twelve) but whereas the model presupposed that this was due to pure financial competition upon suppliers

to win further work, the results did not fully support the economic drivers. Only on 6 occasions (out of 60), were projects awarded to suppliers other than the lowest submitted price. The operational construct does however provide a focus for participants upon performance. Allied to the Hawthorne studies (Mayo, 1949) the process of measurement and desire to compete provides a strong driver to performance improvement. As participant's state:

'...the fact that our performance is being monitored and that monitoring of our performance contributes to our future ability, or not, to secure more work ,...raises the priority to make the customer that bit more important..'

'... if you're going to be measured on something it becomes a greater priority for you'.

'... in the public eye with performance data being published ... they will stick to something ..'

The operational construct of the procurement performance model operates in the manner proposed and in the sequence anticipated.

The sociological construct of the procurement performance model comprised ten behaviours from published research – of which a pilot study with participants identified four group behaviours, placed in order of preference of participants are *relationships* (15), *satisfaction* (13), *incentives* (12) and *motivation* (11). Three methods of statistical analysis provided results to identify the most effective behaviours from the questionnaire survey and interview. Loadings from factor analysis, central tendency from the questionnaire and significant node values from interview transcripts are summarised in Table 11.2.

Table 11.2: Summation of significant behaviour results

Loaded factors from factor analysis	Rotated component value	Central tendency from questionnaire	Mean value	Significant qualitative nodes from interviews	Node aggregate value
Relationships	.725	Relationships	3.92	Relationships	174.56
		Communication	3.49	Communication	46.99
		Trust	3.35		
Incentives	.778	Incentives	3.30	Incentives	58.15
		Motivation	3.30		
Decision making	.772				
Empowerment	.793				

Factor analysis provided a dominant underlying factor – labelled *duration* – under which the behaviour conditions exist and this discovery allows the procurement performance model to be revised to reflect findings. The revised model is shown in Figure 11.5. The operational construct remains as per the originally proposed model because operational drivers of measurement are confirmed. The sociological construct has been adjusted following results in Table 11.2. Ten behaviours identified through a literature review are reduced to the three most significant behaviours prevalent from participant's views. These are *relationships*, *communication* and *incentives*. Furthermore, the ability of such behaviours to exist within a framework agreement is through an underlying factor of *duration*. The underlying factor is represented by a continuous ring.

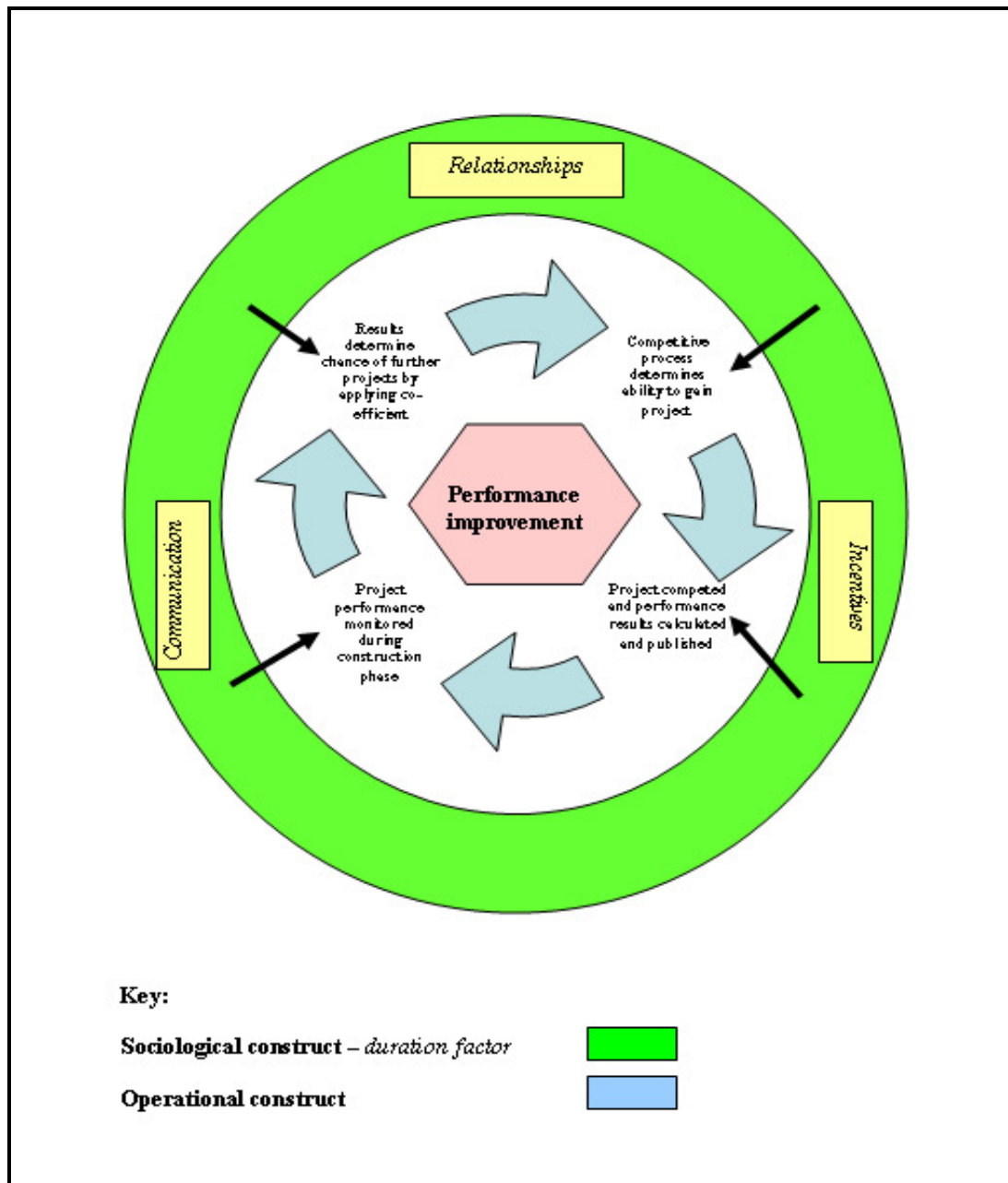


Figure 11.5: Procurement performance model - a posteriori

Intersecting the model are connections between sociological and operational constructs. These represent comments made by participants regarding drivers of performance. Although both constructs compliment each other, participants mention behaviour factors and performance measures as interlinked for performance outcomes. Examples of participants taking a holistic approach rather than viewing individual constructs are:

‘...you’ve got a system which balances the reward for positive or negative performance on issues other than financial ones and I think that’s a balance you’ve got quite good...’

‘...in the framework I think the incentives...of good performance benefiting their next submission in terms of appraising, and the competition improves performances...’

Project outcomes appear driven by operation of both constructs, with interaction existing between both constructs.

11.6 Boundary search

A boundary search is often described as differentiation or discriminate validity where attempts are made to identify boundaries by contextual placement from findings (Rosenthal and Rosnow, 1991). Use of a boundary search allows alignment with comparison of findings to give confidence of outcomes with research studies that share similar boundaries. According to Brinberg and McGrath (1985), differentiation validity is not often present in research findings because boundaries between research projects in social sciences are usually often difficult to define. With construction management, a significant amount of research has been developed for investigation with project outcomes and performance management but less is available for causal relationships and performance measurement. Even within the confines of construction management research, the individual nature of projects provides a significant number of variables making comparison difficult.

This research uses a case study method within which well defined boundaries are placed making comparison of elements possible. The defined boundaries of this research are contained by:

- Research into construction management involving interaction of people with other people who form through experience, qualifications and profession, a specific sociological class. Theoretical perspective is provided through economics and sociological context. Macro economic theory concerns with operation of competition during a tender process whilst sociological studies

concerning performance examine behaviours (Runeson and Skitmore, 2008, p78).

- Public sector containment and regulation provided by statutory controls such as the Local Government Act 2003, Public Contracts Act 2006 and EU Directive 2004/18/EC of the European Parliament of the Council of 31 March 2004. These provide contextual procurement placement, whilst the case study enclosure follows a public service paradigm of probity and transparency. (Johnson *et al*, 2008).
- Geographical placement (UK, South East region).

11.7 Replication

Replication in construction management, where participants are examined at a specific point in time and projects display a unique quality, make precise replication extremely difficult to achieve (Hair *et al*, 1998).

With this research it would be unrealistic to ask all participants to undertake a questionnaire and interview process twice in order to confirm results. Participants would very likely question the process and ‘freshness of data’ with the initial study would not be captured (Hogg and Vaughan, 2008). Instead a pilot questionnaire prepared for 20 participants is used to gain views of behaviours and these were used in construction of a performance model (Hoxley, 2008). A more extensive questionnaire received from 100 participants (including the original 20) was used to provide factor analysis for qualitative sociological group views. An opportunity to gain further depth from participants is provided through semi-structured interviews. The tripartite data collection – pilot, questionnaire, interviews – where results align provides confidence to conclusions made with the performance model.

Replication of project outcomes and critical success factors are likewise unrealistic because although theoretically possible, it is inherently difficult to replicate a construction project. Nonetheless, aggregation of groups of projects allows trends to be detected and provided variables are controlled, a pseudo-laboric approach of replication may be assumed (Brinberg and McGrath, 1985). Examination of outcomes has been applied to a narrow range of 164 projects where characteristics

are consistent (same conditions of contract, employer, administration, specification and highways environment, close geographic location).

11.8 Face validation

Face validation is the recognition by non-researchers of the worth of a study. This is particularly relevant where a study involves professional practice set within construction management. Engagement of participants to the study and involvement with key decision makers contribute towards gaining face validation of the subject matter (Lucko and Rojas, 2010). As this research is set within public sector construction management, it was regarded as beneficial in obtaining approval by central government of results from the pilot study. Appendix 7 reproduces a letter from the Minister of State for Construction and Enterprise supporting pilot results from the research and the case study setting within which it sits.

Use of structured interviews by engagement with experienced participants from a defined sociological class has allowed face value to be added to this research from qualitative analysis.

11.9 Convergence through engagement of data

Following validation and replication of the methods used, a convergence through analysis of this research is undertaken to ensure a significant engagement with professional practice. This requires a substantive body of work representative of a group comprised of experienced and qualified construction management professionals to enable sociological enquiry. In addition, a significant value and number of projects for analysis provides mass to the research value. Table 11.3 provides an overview of data.

Table 11.3: Overview of data collected for this research

Context	Element	Computation	Quantum
Civil engineering projects	Project success indices Critical success factors Total project duration Total project value	PSI x number of projects CSF x 5 x number of projects Aggregated total of each projects duration Aggregated total of each project tender value	n = 164 n = 820 18,268 days (50.05 years) £47.35M
Questionnaire	Returned valid questionnaire Returned valid questions Participants experience	Total number of completed questionnaires Completed questionnaires x 34 questions per questionnaire Number of participants x mean years of participants experience	n = 100 n = 3,400 c 1,820 years
Interviews	Interview transcription Participants experience	Aggregated total of interview transcripts Number of participants x mean years of participants experience	26,710 words 241 years

The overview in Table 11.3 comprises a considerable amount of data related to the case study boundary. Whilst data from projects has been included with statistical analysis in its entirety, selective responses relevant from interviews and questionnaire surveys were adopted following precedent by Hofstede (2001). Reference to published research identified behaviours allowing fundamental relationships to be conceptualised in the performance management model. A questionnaire was developed for the overall case study – but included selected questions into behaviours related to the case study. The purpose of both questionnaire and interview was to create convergence with the project outcome results and this has been achieved. With this respect, the holistic nature of the performance management model is confirmed.

11.9 Sharing research findings by publication

An important facet of research is sharing of findings with practitioners and the wider academic community. Achieved through publication of articles in academic journals and presentation of papers at conference proceedings, this process exposes meanings, methodologies, assumptions and interpretation of the research to critical enquiry by experts and peers (Runeson and Loosemore, 1999). Feedback from a publication and presentation process is invaluable because it provides contextual positioning of the research within its setting and provides enhancement to fortify conclusions at each stage. Over the period of this research, articles and presentations have been made to publicise the subject matter and gain feedback from cohorts:

- Gale (2010a) – Article in Civil Engineering Surveyor
- Gale (2010b) – Referred paper in the Construction, Building and Real Estate Conference of the Royal Institution of Chartered Surveyors
- Gale (2011) – Referred paper in the 10th International Postgraduate Research Conference
- Gale (2012) - Poster and presentation 6th Annual Research Student Research Conference
- Gale and Lam (2013) – Referred paper in the 11th International Postgraduate Research Conference

Publication of articles and papers provides academic review by others and discussion from interested parties engaged in professional practice. Gale (2010a) received positive comment from members of the Chartered Institute of Civil Engineering Surveyors concerning the originality of this research. Presentation of paper Gale (2010b) in Paris and Gale (2011) in Salford allowed discussion with other construction management researchers regarding research methods selected and proposed performance model. The presentation Gale (2012) announced pilot results from the research at a conference in Cambridge whilst Gale and Lam (2013) publishes key project outcomes of differences between the two procurement methods compiled from the research.

11.10 Summary of review of model and research validation

This chapter presents evidence of validation of each group hypotheses by examination of construct validity, verification, causality and the external interfaces. Convergence is provided by triangulation of quantitative data from project outcomes by qualitative data and statements from participants supporting such outcomes. Examination of project characteristics reveals verification of results that can be generalised to other projects working to the same conditions and operational methods.

The procurement performance model (a priori) was tested through application of six hypotheses based upon an operational and sociological construct. Results from operational (performance measures) and sociological (behaviour factors) constructs have allowed a revaluation of the model. Proposed operational constructs behave as anticipated and provide drivers toward positive performance. Analysis of behaviour factors provided a focus upon the most significant behaviours – the priori model identified ten from published research – whereas the ‘a posteriori’ model recognises three behaviours within an underlying factor of duration.

Publication of results has provided convergence of the research findings with published research and academic validation of accepted papers. In summary, it is argued that the strength of evidence supports both posteriori performance model and research validation.

CHAPTER 12: CONCLUSIONS AND RECOMMENDATIONS

12.1 Introduction

Performance of the construction industry, during engagement, construction or completion, has been a significant concern for clients and particularly those within the public sector. Added into this mix are the demands of public finance, where challenges of accountability and transparency are wrapped within a political arena.

The opening chapter of this thesis identified a number of recurring themes from published government reports, professional practice and academic studies criticising selection of suppliers by price alone with a myriad of differing controls and lack of standardisation throughout the industry. The wide fluctuations in workload volumes had created an industry with a transient workforce – where skills and experience are gained and lost to a cyclical pattern. Solutions suggested improving performance by selection of suppliers through price and quality, application of consistent management standards and contractual terms, and access to stable volumes of work.

A response from clients to criticism from the reports included introduction of framework agreements by engagement of suppliers over a long term period with the intention of improving overall performance of public sector projects.

The aim of this study is to assess whether the use of framework agreements for construction projects can result in significant improvement with performance outcomes when compared to traditional discrete methods. In particular, the objective of this research considers specific elements of performance as follows:

- Investigation into construction project outcomes for the difference between the two methods of procurement.
- Determine variances between production and transaction (engagement and performance monitoring) costs for projects procured within framework agreements and those engaged through traditional procurement.
- Identify performance drivers within the procurement process by developing a procurement performance model to ensure continuous improvement in performance with the engagement and construction stages of a framework agreement (a priori) and then review the model against results collected from the case study research (a posteriori).

In this chapter, a summation of critical success factors and project outcomes are made together with a review of the financial effects to the client of engagement, transaction and production costs between the two procurement methods. The impact of this research to professional practice is considered, particularly with regard to the procurement performance model at both local case study organisation and over a wider public sector audience.

Recognition of limitations of this research together with reflections upon the methods and effectiveness of the study provides a conclusive finale to the chapter.

12.2 The impact of a framework approach upon project outcomes

Classification of project success will vary according to the contextual positioning of that client. Johnson *et al*, (2008) contrasted private sector culture (commercial considerations and confidentiality) with that of public sector (public service and openness). Whilst this may affect clients' perceptions, studies into construction management have consistently returned to an 'iron triangle' of time, quality and cost ascribed by Atkinson (1999) as a reasoned measure of project success. Subsequent studies have introduced other key performance indicators, whilst more recent research (Yuan *et al*, 2009) has raised concerns from practitioners and clients alike regarding the effort of measurement and collation of data involved with the process.

Yeung *et al*, (2008) suggested seven indicators of project success and these have been modified within this research into five Critical Success Factors (CSF) used as a measure for comparison with each project. The aggregated values form a composite Project Success Index (PSI) for each project.

A major difficulty with quantitative analysis of construction projects is the lack of comparative data (Hillebrandt and Hughes (2000), Hughes *et al*, (2006)). Often project outcomes are described as a variance between tender values and final values (e.g. financial or time parameters) without a consideration of causes relating to such variations. This research undertakes a comprehensive system of analysis by following standard contractual mechanisms for apportionment of variations according to the source (i.e. client permitted variation). Calculation of values for each index required an expansive equation allowing application to project parameters

that integrates with operational data. The full equation is described in paragraph 7.10 and operational data in paragraphs 7.11.1 to 7.11.5.

Favie and Maas (2008) undertook exploratory research to consider if project characteristics affected performance outcomes and these were used to filter the case study projects for variance. Only one characteristic was realised, (that of value) which may affect outcomes. Empirical analysis therefore proceeded upon the basis of two groups. Stage One group analysis examined all projects irrespective of value and uses independent samples t-tests to determine differences between all 164 discrete and framework projects. Stage Two group tests matched the closest 120 by size (value) in order to ascertain if the value characteristic affected outcomes. Paragraph 7.16 examined both sets of results and concluded that project outcomes included within this study were not affected by size (value).

Of the five critical success factors for project success analysed by this research, only CSF1A (starting on time) produced a small magnitude of difference between discrete and framework projects. CSF1B (finishing on time) and CSF3 (right first time) produced significant differences, whilst CSF2 (accuracy of payments) and CSF4 (health and safety) demonstrated significantly large differences with the magnitude. A radar diagram in Figure 7.7 illustrates performance outcomes for the two engagement methods showing impact of the framework approach.

12.3 The impact of framework approach upon transaction and production costs

An empirical investigation of financial viability of frameworks arises from questions raised through professional practice and a recent government report. The *Government Construction Strategy* (Cabinet Office, 2011) made reference to the *'highly effective use of frameworks, but also to other frameworks which are less effective'*. In this context, the report makes specific mention of restrictions placed by the closed nature of framework agreements to new participants. Operation of economic theory (Locke, 1691) dictates that restrictions to perfect market conditions result in higher prices. In recognition of economic theory (Morgan, 2009) and a reduction in fiscal spending by public sector organisations, a partial return to 'lowest price wins' selection remains despite concerns with this method (RICS, 2011b).

In order to examine possible effects into restrictions placed by framework agreements three areas of financial viability in chapter 8 were selected for study:

- Variances between production costs for projects procured within framework agreements and those engaged through traditional procurement.
- Variances in transaction costs between the two procurement methods.
- Variance between performance monitoring costs arising from use of the two procurement methods.

An investigation into such costs from published research proved difficult as discovered by Hillebrandt and Hughes (2000) and Hughes *et al*, (2006). Indeed, the interaction of economics, competition and selection has an '*ethereal and complex nature* {that} *does not lend itself to easy comprehension*' Flanagan *et al*, (2007).

Notwithstanding difficulties with measurement and classification of financial viability, an opportunity was taken to explore significant amounts of financial data uncovered through the case study not normally accessible due to commercial sensitivities.

Within the civil engineering field, cost prediction is undertaken on 'an approximate quantities' basis rather than an elemental cost per unit metric. A discussion of methods used in chapter 8 elected for a benchmarking system which matched professional practice and proposed NRM rules (RICS, 2012). Results from t-tests undertaken to detect variances between pre-tender estimates and accepted tenders for discrete and framework agreement projects produced no significant difference in value ($Eta^2 = 0.018$). The reasoning made from these results is that production costs for the case study projects have not been affected due to the transition from discrete to framework agreement procurement. A further test to reinforce this view involved an 'action research' project tested by live market conditions. In this particular instance a framework project was issued on a discrete tender basis. Results from the action research project behaved as anticipated – with framework suppliers providing tenders within open market values.

Further analysis of the financial viability of frameworks verses discrete projects concerned costs involved with engagement and performance monitoring. Reference to published literature did not discover any directly comparable research into these areas, but allied studies regarding cost of quality and key performance indicators provided a basis for construction of hypotheses. Reasoning, from published literature determined that either discrete or framework agreement would require the same level of construction management resource for engagement and monitoring. This research

took the opportunity to analyse detailed and reliable cost records – in contrast to previous transaction cost research where accurate timesheet records were considered unstable (Hughes *et al*, 2006).

Conclusions in paragraph 8.18 of empirical evidence confirmed a hypothesis of parity for performance monitoring costs between the two procurement methods ($\text{Eta}^2 = 0.029$), but a difference existed with engagement transaction costs ($\text{Eta}^2 = 0.174$). The magnitude of difference in the means was significant – but unexpectedly favoured framework agreements. One area suggested for this result was that engagement transaction costs are reduced through framework agreements due to standardisation and repetition of contract documentation and control mechanisms.

12.4 Reflection of the procurement performance model

As no directly comparable research into framework agreements has been discovered through the literal review, a priori model was constructed from published literature into sociological behaviours of a technical class and measurement of performance. The model proposed improvements with performance through framework agreements by ten sociological behaviours (of high performing groups) and operation of a performance management process.

Examination of the effects of performance measurement and management process was examined through a quantitative identification of project outcomes. Results reflecting operational controls confirmed the operational construct proposed by the model, indicating that operational methods of framework agreements do encourage performance improvement. Reinforcing measured improvements in project outcomes afforded by framework agreements are participant's views of the outcomes.

Investigation of sociological behaviours was undertaken through a predominant qualitative survey using questionnaire and interview methods. Three analytical methods were used to detect the most significant behaviours and underlying factors. Synthesis of results identified three significant behaviours, *relationships*, *incentives*, *communication*, set within a factor of *duration*. The underlying factor of *duration* reflects long term arrangements of framework agreements and allows development of the three significant behaviours. Furthermore, comments from practitioners identify connections between the two constructs in the model. The revised model, a posteriori, is shown in Figure 11.5.

Reflection of the procurement performance model confirms that operational methods drive performance as anticipated and that these are readily understood by participants. Use of performance measurement provides a focus upon performance outcomes provided these engage with operational methods used by construction management (key dates for projects, contractual records and the like). The 'a priori' model recognised ten behaviours from published research – of which participants identified four in a pilot questionnaire. The 'a posteriori' model confirmed three of the original behaviours driving performance and an underlying factor for the sociological construct.

A generalisation of views from interviews and questionnaires support framework agreement performance and reinforces the arrangement of behaviours and cultural awareness. The qualitative views supplement quantitative empirical results in order to provide a confirmatory convergence.

12.5 Impact of this research upon professional practice

The construction industry has been traditionally viewed as underperforming by public sector clients and this has encouraged collaboration methods to be developed in response. Such methods include use of partnering statements (non-contractual), partnering agreements (contractual), framework arrangements (mix of non and contractual) and framework agreements (contractual). In addition, developments with key performance indicators and incentivisation methods have all been offered as ways of improving and placing performance as embodied culture. Introduction of formalised framework agreements within the UK public sector is a recent phenomenon and the opportunity to study, in detail, the effects of such arrangements upon performance is extremely limited.

A contribution to knowledge offered by thesis is by encapsulating a case study during transition from traditional to collaborative procurement. Discussion regarding effectiveness of public sector framework agreements often produces polarised views, irrespective of public or private sector source. Some practitioners favour frameworks completely whilst others are concerned with stifled supply and reduced economic competition. A recent central government report, *Government Construction Strategy*, Cabinet Office (2011) mentions such views.

The impact of this research upon professional practice is examined according to the researcher's professional background, the case study organisation, a wider public sector environment and a construction industry context, each in turn.

12.5.1 Relevance to the researcher's professional background

The case study context and background with construction management is interwoven with the researchers' profession and practice. Use of case study results is placed within '*an exploratory way to contribute further towards theory development by developing analytical generalizations*' (Bresnen, 2010, p. 619). Such theory development aligns with collaborative approaches for improvement in performance. The researcher is a Chartered Quantity Surveyor, Chartered Arbitrator and qualified Project Manager with considerable experience in building and civil engineering projects from feasibility to completion. The researcher is responsible for strategic implementation and delivery of a capital programme of works and providing advice for strategic procurement systems in future years.

Results from this research are relevant to the researchers' professional background on a number of levels. In the field of construction economics, analysis of transaction and production costs provide an opportunity to explore economic theories and examine effects of the case study projects. Traditional construction economic tendering theory follows general economic theory of perfect market competition and the effect of restricted supply through framework agreements is a professional interest. Within the public sector contextual placement, the researcher has a duty of public service and social responsibility to his Employer. This includes being aware of decisions affecting expenditure during a time of budget constraint. Any opportunity to increase efficiency of construction projects allows expenditure from savings made to be released for other public sector services – supporting revenue budgets for libraries and schools for example. The quest for efficiency is therefore both professionally and morally demanding of the researcher.

A further area of relevance to the researchers' background is to provide a comprehensive method of measurement that integrates with professional practice and thereby allows comparison of project outcome results. The ability to construct a technical bridge between professional practice and theoretical propositions by detailing a prescriptive and defined measurement process for practitioners is of

significant value. There has been previously little research into translation of construction management practices into metrics available for comparative purposes that relate to operational measures.

Alongside operational measures are the sociological factors that Hvid and Møller (2001) argued comprised a value system developed in informal social groups from the actors' relations to, and opinions about, the contextual placement. Such groups (referred to in this thesis as a sociological class) are often formed spontaneously around a shared practice with the purpose of assigning meaning to the participants' actions. The drivers behind such social interaction are of great interest to practitioners because these gear performance. The procurement performance model provides practitioners with a holistic view of improvement in framework agreements through extended duration and these can be used to change practice. Examples are an increase in performance meetings, feedback on interim results and use of sociological group enhancement (such as views from stakeholders, messages of congratulation on successful projects, early warning meetings concerning low performance, and the like).

12.5.2 Relevance to the case study organisation – Hampshire County Council

This research has been supported by a local authority – Hampshire County Council – and free access has been afforded by the organisation to collection of data from projects and participants. Collection of data is undertaken during a transition period for the organisation providing the opportunity to gain data from both procurement methods between the periods 2006 – 2010. Framework agreements were introduced in 2008 and represented the first iteration of this procurement method by the organisation. Results from analysis of case study are particularly relevant to the organisation because in 2011 a strategic decision was required to continue with framework agreements or revert to discrete methods. Commencing in April 2012 and running until March 2016, the second generation framework agreement has incorporated sociological drivers and operational measures from the procurement performance model into the managerial structure of the framework.

12.5.3 Relevance to a wider public sector environment

The construction industry is a significant contributor to the wellbeing and growth of the UK, representing an estimated annual turnover of £110 billion (6.8% of GVA) (ONS, 2010). Of this value, approximately £41 billion is funded by the public sector; with £7 billion annual spend upon infrastructure. Importance and value of the sector has not escaped the notice of central government with opportunities to improve efficiencies through the *Government Construction Strategy* (Cabinet Office, 2011). Such improvements also impact upon local authorities, either directly through grant support from central government or through local budget pressure. Fiscal reduction in expenditure during 2011/2012 and successive years have impacted overall capital programmes with local authorities also looking to gain improvements with performance of projects.

As empirical results from this research developed, an opportunity was undertaken to engage with geographically adjacent authorities to discuss findings. A series of meetings with adjacent professional officers together with development of second stage framework agreements provided an informed decision to use the procurement performance model within South East Seven Civil Engineering Framework Agreements. Alignment of Hampshire County Council case study outcomes, using critical success factors and project success index criterion has been aligned with other authorities with the same definition base and measurement process. The expanded framework, based upon the case study is for eight authorities with an estimated total value of circa £100M. Details of the framework are given below:

- Defined by article 32 of EU Directive 2004/18/EC and Regulation 19 of the Public Contracts Regulations 2006.
- For Highways related construction works of individual project values up to £5,000,000 – total framework value estimated at £100M.
- Four years duration between 1 April 2012 and 31 March 2016.
- Official Journal of the European Union (OJEU) reference 2011/S 211-344223
- For geographical coverage as detailed in Figure 12.1

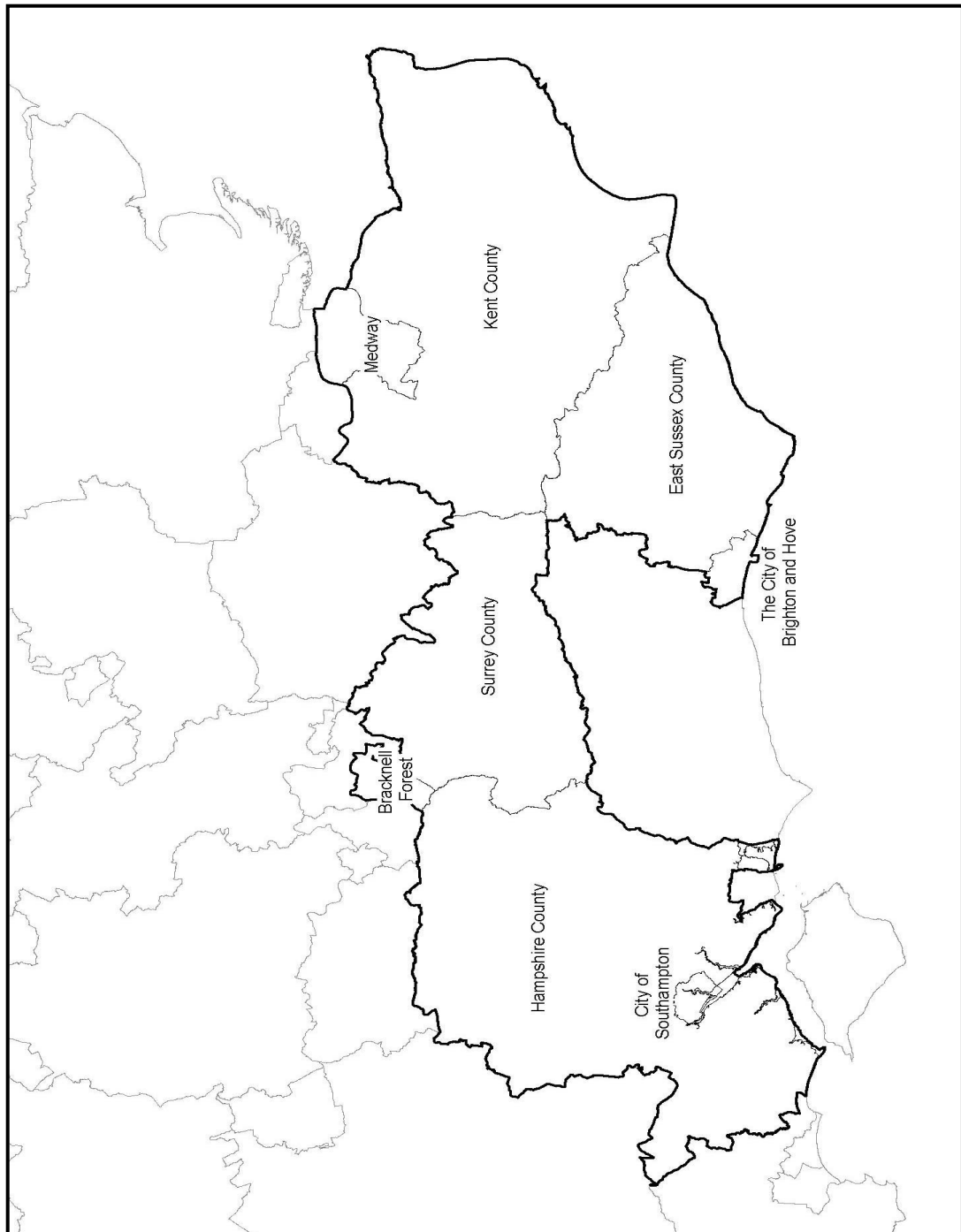


Figure 12.1: Map of framework geographical coverage

In addition to the wider geographical coverage afforded by the expanded framework agreement, results from this research have been supplied to UK Central Government for comment and information. Responses, which are positive and supportive, are shown in Appendix 7.

12.5.4 Relevance to the construction industry context

The case study is set within a public sector environment with examination of projects representing characteristics of a highways infrastructure class. Although results may be comparable with projects sharing this technical class and environment (and these represent a significant portion of £7 billion annual expenditure identified in paragraph 12.5.3), results from the research are likely to have substantial relevance to the construction industry generally.

All projects contained within this case study have been procured under the New Engineering Contract 3rd Edition (NEC3) with organisational structures (Client's Project Manager, Supervisors, Contractors Representative and the like) reflecting the roles, duties and responsibilities for each party in accordance the contract terms and conditions. This research collates quantitative data from sources through operation of the NEC3 making comparison with other contracts of the same form directly relevant.

The developed procurement performance model provides a holistic approach to improvement with performance that is particularly relevant to construction management. Strength of participants views provide transferable behaviours that may be applied where an underlying factor of duration is present allowing development of such behaviours. Provided sociological drivers are accompanied with operational measures, thereby allowing engagement of participants experienced with contextual placement, it is proposed that outcomes in performance will improve. Although the model was specifically developed for framework agreements, as the underlying factor is one of duration, the model lends application to long term projects undertaken within the construction industry generally.

12.5.5 Impact of procurement performance model for future projects

The procurement performance model has been incorporated into second generation frameworks described in paragraph 12.5.3 and therefore effects and results experienced by framework projects examined in this treatise are expected to continue. As the model is geared, critical success factors and project success outcomes are expected to remain at the fore of participants objectives, but the pressure to perform is anticipated to increase. The intrinsic construction of the model

using methods of measurement detailed in this thesis provides a grading process for comparison of supplier's performance. As the number of projects placed through the framework increases, valuable detection of areas of exceptional performance (positive and negative) will be available for analysis and action.

Operational performance measures (KPI's) have remained consistent between the first and second frameworks due to the effective results arising from this research and continue to perform as anticipated. Aware of the drivers of incentives (financial and non financial), communication and relationships arising from an underlying factor of *duration*; strategic contract management of the second generation framework has been expanded to include extensive and regular feedback meetings between clients and suppliers. Discussion with participants has provided positive comments on the effectiveness of this approach.

Financial viability of second generation frameworks has confirmed efficiencies with the engagement transaction costs. Transaction costs remain within limits experienced by this research but mean project value (size) has increased, making the transaction costs proportionally more effective. Financial performance and standardisation of documentation and controls has encouraged a significant use of the second generation framework by South East public authorities.

In summation, the procurement performance model is recommended for full implementation use by client organisations, using the following provisos:

- Client and suppliers construction management staff should be informed of real benefits of frameworks to enhance attitudes with collaboration.
- Client construction management staff should be trained to strengthen their sociological and operational skills, particularly with group objectives, communication and KPI measures.
- Increased financial incentives should be provided to motivate suppliers.
- Duration of frameworks is increased enabling stronger relationships, communication and motivation to be achieved more extensively.

12.6 Limitations of the research and case study method

Although great care has been taken to align this research with professional practice in construction management and regulatory legislation relevant to a public sector

environment, it is recognised that results are obtained from a single case study. In order to provide mass to the results the case study is set within a significant local authority organisation a widened view is undertaken through collection and integration with external sources. The case study encompasses a substantial influence from experienced engineering professionals – external and internal to the organisation. Results from performance of fifteen external companies, including regional and national construction companies are used to represent a range of suppliers.

As noted by Babbie (1992), perfect indicators for performance can rarely be developed from theoretical concepts. Whilst the most appropriate indicators following an examination of published theory and empirical evidence are chosen, these provide no guarantee for ultimate best match. As such data may be considered unique to the case study and outcomes, and this may provide a limitation to replication.

A counter argument to the above is that, provided the organisation is representative of similar local authorities and source data is consistent in characterisation, apportionment or bias has no significant effect. The use of multiple research methods and convergence between data has been used to support representation and characterisation of results.

It is recognised, through boundary limitations, that this research is undertaken wholly within the UK, within a legal system, standard form of contract and technical specifications set within that location. Macro-cultural influences of Western European construction management practices may create significant differences to results and this provides a potential area for further research to confirm external validation.

12.6.1 Areas for further research

Following findings from this research and mindful of limitations noted, the following recommendations are provided for potential future research within this subject matter:

- The research has revealed that operation of a framework agreement, provided that care is taken to clearly identify critical success factors and

appropriate systems of measurement are incorporated, a significant improvement in performance outcomes can be achieved. Established through a single case study and defined by extension into a regional framework, an opportunity for further confirmatory research is appropriate.

- This research has examined the impact to tender price values through a framework agreement engagement. Such purpose is to compare financial performance of discrete traditional 'lowest price wins' public sector tendering arrangements with those of collaborative framework procedures. As framework arrangements allow the potential to form closer relationships between parties, detailed examination of costs spread throughout the supply chain may be available. This could allow an opening for study into competitiveness of suppliers as suggested by Flanagan *et al* (2007).
- The case study projects are set predominantly in the field of highways civil engineering. This has allowed a detailed comparison of outcomes due to the specific classification, but other types of projects could be explored. It is suggested that buildings and other projects sharing characteristics are used for further research purposes.
- Contextual placement of this research is limited to construction projects set within the public sector and subject to European legislation and UK regulation. The influence of latter legal restrictions may be significant when transferred to other countries. It is suggested that this study is replicated in other countries where framework agreements display similar characteristics in order for comparative analysis to be undertaken.

12.7 Final words

In summary, this research sought to explore through quantitative and qualitative investigation if any statistically significant performance difference may be detected between projects procured through a traditional discrete procedure when compared with those within a framework agreement. The conclusion is within context of a public sector environment; such frameworks may produce measurable improvement in performance.

Confidence with case study results for this research has enabled a subsequent framework arrangement to be constructed for use over the South East region of the United Kingdom and in so doing, has expanded professional practice over eight separate local authorities. Furthermore, engagement with the profession has been achieved through publication in technical and academic journals. This aligns with objectives of a professional doctorate which, according to QAA (2011, pg 18), concludes:

'a practice base rather than an exclusively institutional focus; candidates are working while completing their doctorate and already possess significant professional experience. Successful completion of the degree normally leads to professional and/or organisational change that is often direct rather than achieved through the implementation of subsequent research findings.'

{Personal reflections – first person context}

Completion of this last chapter has allowed a reflection upon how the research process, thesis and engagement with academic practice have affected me. Philosophically, the research programme has allowed me to take a distanced approach within a work based practice - away from operational management and day to day decisions – enabling a critical view to be applied to conceptual theologies. Therefore individual projects, using a philosophical approach are viewed as variables to a strategic model. The systematic 'deconstruction' of data into components through analytical techniques and 'reconstruction' through logical progression paints a picture of 'what is going on' and is a taught skill that will remain with me – and one I intend to use for other aspects in my life.

My professional practice has been changed through the research. Close engagement with central government will continue by reporting results upon performance and I am encouraged and look forward to continued research into construction management topics through the many academic friends and contacts I have made....
ad multos et faustissimos annos.

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APPENDICES

Appendix 1: The link between HCC corporate priorities and framework actions

HCC CORPORATE PRIORITIES	HIGHWAYS AND TRANSPORT ALLIANCE OBJECTIVES	IMPROVEMENT WORKS FRAMEWORK ACTIONS	
HAMPSHIRE SAFER AND MORE SECURE FOR ALL	OPERATIONAL SAFETY	Improve Network User Safety	Develop and implement a programme of safety and accessibility improvement schemes
			Reduce accidents involving the public at work sites
		Improve Road Worker Safety	Follow CDM regulations and Alliance CDM Working Procedure, review procedures in light of changes to CDM regulations
			Obtain accurate Statutory undertaker plant information to reduce 'strikes' that can cause injury
			Ensure compliance with method statements and H&S plans. Continually review practices
			Ensure risk assessments are routinely undertaken by suitably trained and experienced staff for all necessary activities
		Maintain the Network in a Safe And Servicable Condition	Maintain or improve road surface condition in adherence with Asset Management Plan
			Deliver Programme of renewal schemes
			Provide a rapid and effective response to defects
			Provide a rapid and effective response to emergencies
MAXIMISING WELLBEING	HIGH QUALITY CUSTOMER SERVICE	Deliver a high level of public satisfaction	Deal promptly and accurately with customer complaints. Continually reduce the number of valid complaints
			Keep the public informed of works that will effect them
			Obtain and respond to feedback from the public
		Deliver a high level of Member satisfaction	Consult with Members on Service Priorities
ENHANCING OUR QUALITY OF PLACE	RESPECT THE ENVIRONMENT AND SUPPORT THE LOCAL ECONOMY	Minimise Environmental Damage	Minimise the amount of construction waste sent to landfill by reusing wherever practical, maximise the use of construction waste in higher grade applications.
			Reduce the Carbon emissions required to deliver the service through cleaner vehicles and more efficient journeys
			Increase the use of recycled or secondary materials
		Support the Local Economy	Continually seek to increase the amount of products and materials from Hampshire
IMPROVED EFFECTIVENESS AND EFFICIENCY	EFFECTIVE CONTRACT MANAGEMENT AND ONGOING PERFORMANCE IMPROVEMENT	Continually Improve Work Quality and Service Efficiency	Prevent excessive rework and defects
			Continue to develop staff through formal training
			Reduce the amount of non-value adding activities
		Manage the Contract Effectively	Accurately forecast works costs and durations
			Process invoices and payments accurately & expeditiously
			Provide a service that complies with relevant legislation
			Ensure that contractual obligations are met
			Work efficiently & effectively to deliver the requirements and service aims of the Contract

Appendix 2: Executive Member approval for frameworks

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Hampshire County Council Executive Member - Environment 9 October 2007 Improvement Works Framework 2008-12 - Authority to Tender Report of the Director of Environment	Item 1
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Contact: Phil Samms, ext 7072 email: phil.samms@hants.gov.uk

1. Summary

1.1 This report summarises the new contract strategy for highways developed by the Environment Department for the ongoing delivery of the highway service for the Council. It specifically highlights the importance of the proposed Improvement Works Framework (IWF) in the ongoing delivery of construction schemes with a more Council and customer focused approach, and seeks approval to tender the two framework arrangements that comprise the overall IWF.

1.2 The new IWF builds on experiences from existing contractual arrangements, together with best practice employed by other local authorities, to provide a service more closely aligned with the Council's aspiration to enhance cost and programme certainty for schemes delivered by the Environment Department. The new Framework also forms part of a Highways and Transport Strategic Alliance aimed at aligning suppliers directly with the corporate objectives of the Council.

1.3 On 20 March 2007 the Buildings, Land and Procurement Panel considered a report on 'The Proposed Highways Contract Strategy Principles' and resolved to advise the Executive Member for Environment to approve the proposals. These proposals included the introduction of the Term Highways Contract 2008-15 (currently being tendered), and the Improvement Works Framework 2008-12, which is the subject of this report. The County Council has a statutory duty to maintain highway infrastructure in a safe and effective manner. The new Term Highways Contract will ensure that the current high standards for the safe operation and maintenance of highways and highway related structures within Hampshire are continued following the cessation of the existing Highways Term Maintenance Contract on 30 April 2008.

2. Recommendations

2.1 That approval be given to the revised approach, as set out in the report, for procurement of the two framework arrangements comprising the Improvement Works Framework 2008-12, to facilitate the delivery of maintenance and improvement works to highways, related structures and other construction related projects within Hampshire:

Framework 1: Highway Works up to a value of £500,000

Framework 2: Structures Works from £50,000 and larger scale Highway Works (>£500,000), up to the European Union procurement limit for works (currently £3.6 million)

2.2 That approval be given for the cessation of the Register of Approved Contractors for Highway Works as of 1 May 2008.

<http://www.hants.gov.uk/decisions/decisions-docs/071009-execmb-R1002100520.html>
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3. Background

3.1 The Environment Department is constantly striving to ensure that it delivers a high quality highways service for the people of Hampshire within current and future budget constraints. To this end, the Department is regularly reviewing procurement as a key factor in the search for enhanced value for money services.

3.2 Currently the Department delivers maintenance and improvement schemes through a combination of open tenders, using contractors held on a Register of Approved Contractors for Highways Works, and a Framework Arrangement for Minor Highway Works (for more straightforward highway schemes up to £200,000). The Register of Contractors operates on a five-yearly cycle, containing over 50 contractors who have pre-qualified to deliver certain values of scheme. The current Register is due to come to an end on 31 March 2008. The Framework Arrangement also concludes on this date.

3.3 The current arrangements have provided good service over many years, with the Framework Arrangement in particular offering proven value for money compared to tendered schemes. The Register of Approved Contractors has, however, presented problems in managing the number of contractors available to deliver schemes. Many of the companies on the list have shown little actual interest in completing works when invited.

4. The New Highways Contract Strategy

4.1 As set out in the 'Proposed Highways Contract Strategy Principles' report to the Buildings, Land and Procurement Panel on 20 March 2007, the new contract strategy consists of two main elements:

- (i) a new approximately £30 million Term Highways Contract; and
- (ii) a new Improvement Works Framework (value dependent upon capital programme budgets).

4.2 The new Term Highways Contract is currently being tendered, and will cover all the services offered by the existing Highways Term Maintenance Contract, with the addition of main road surface dressing and environmental bridge maintenance. It builds upon existing performance-based clauses, to encourage a more outcome-focused approach, with particular emphasis on the way in which works are delivered. The contract also calls upon significant progress within the existing contract to encourage the use of more sustainable construction methods and processes.

4.3 The new IWF will provide a replacement for both the existing Framework Arrangement for Minor Highway Works and the Register of Approved Contractors for Highway Works. This ensures the delivery of the majority of highway and structures related schemes carried out by the Department, up to the European Union's limit for works (currently approximately £3.6 million). The new framework offers a more streamlined and efficient system for the delivery of the Integrated Transport, Structural Maintenance and other key programmes. The new framework will also be made available for use by District and Borough Councils for the delivery of any minor civil schemes that they wish to undertake, and they will also continue to undertake design and supervision work under the agency arrangements where mutually beneficial.

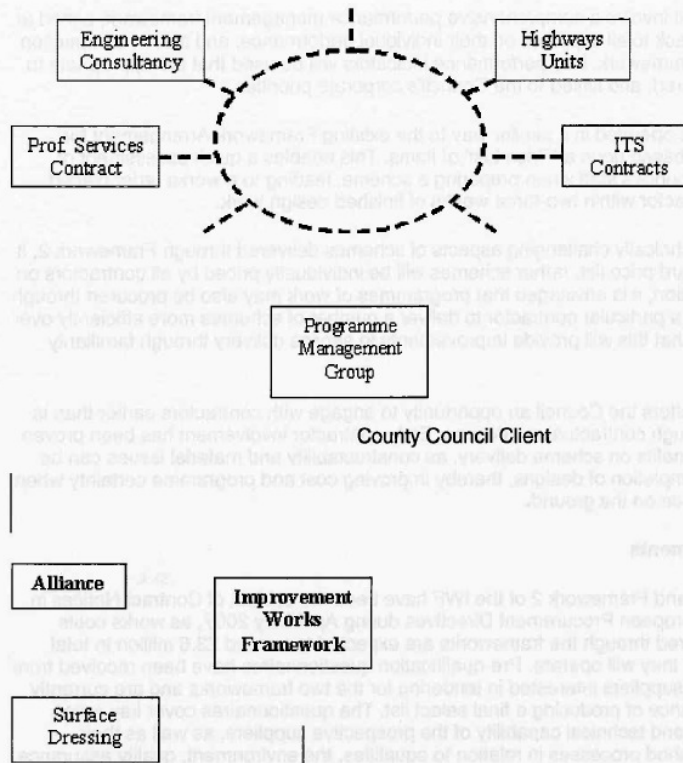
4.4 It is proposed to operate the Term Highways Contract and Improvement Works Framework closely alongside each other, as an overlap of services will be provided to support the delivery of the highways service by the most appropriate means. It is therefore intended that the two contracts, plus others operated by the Department, will be managed through a strategic alliance, as indicated in the diagram below:

Term Highways Contract

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5. The Improvement Works Framework 2008-12

5.1 The IWF consists of two separate framework arrangements:

Framework 1 - Highway Works up to a value of £500,000

Framework 2 - Structures Works from £50,000 and larger scale Highway Works (>£500,000), up to the European Union procurement limit for works (currently £3.6 million)

Both frameworks will be based upon a modern form of contract, employing the use of the New Engineering Contract (Third Edition), similar to the Term Highways Contract 2008-15/18. This form of contract provides significant advantages over existing arrangements, in terms of flexibility and clarity, and is also well recognised in the construction industry as a stimulus to good management.

5.2 It is intended to operate Framework 1 with four to six contractors, and Framework 2 with four or five. Exact numbers will be ascertained following the tendering process on the basis of competitiveness, as it is intended that only those contractors who are likely to be successful in being awarded works through either framework are included.

5.3 Both frameworks are proposed to be four years in length, as this is the maximum timescale permitted for such arrangements by the European Union. Four years will provide an ideal timescale to develop good working relationships with all contractors on the frameworks, and also to review their relative success of the two frameworks, in advance of their replacement in 2012.

<http://www.hants.gov.uk/decisions/decisions-docs/071009-execmb-R1002100520.html> 21/03/2011

5.4 Both frameworks will involve a comprehensive performance management framework, aimed at providing regular feedback to all suppliers on their individual performance, and also in comparison to others on the same framework. Key performance indicators will be used that are appropriate to the service being delivered, and linked to the Council's corporate priorities.

5.5 Framework 1 will be operated in a similar way to the existing Framework Arrangement for Minor Highway Works, based upon a 'Price List' of items. This enables a quick assessment of scheme costs by the Council's staff when preparing a scheme, leading to a works order placed with the cheapest contractor within two-three weeks of finished design work.

5.6 Due to the more technically challenging aspects of schemes delivered through Framework 2, it will not employ a standard price list, rather schemes will be individually priced by all contractors on the Framework. In addition, it is envisaged that programmes of work may also be procured through Framework 2, enabling a particular contractor to deliver a number of schemes more efficiently over a period. It is intended that this will provide improvements to service delivery through familiarity and standardisation.

5.7 Framework 2 also offers the Council an opportunity to engage with contractors earlier than is currently permitted through contractual restrictions. Early contractor involvement has been proven to deliver noticeable benefits on scheme delivery, as constructability and material issues can be resolved prior to the completion of designs, thereby improving cost and programme certainty when works actually commence on the ground.

6. Tendering Arrangements

6.1 Both Framework 1 and Framework 2 of the IWF have been the subject of Contract Notices in accordance with the European Procurement Directives during April/May 2007, as works costs anticipated to be delivered through the frameworks are expected to exceed £3.6 million in total over the four years that they will operate. Pre-qualification questionnaires have been received from a significant number of suppliers interested in tendering for the two frameworks and are currently being assessed in advance of producing a final select list. The questionnaires cover key areas relating to the financial and technical capability of the prospective suppliers, as well as their experience and established processes in relation to equalities, the environment, quality assurance, and health and safety.

6.2 It is intended to invite six to ten contractors to tender for each of the two Frameworks. Tenders are programmed to be issued in early January 2008, following the award of the Term Highways Contract in December 2007. This is to ensure that the new Term Highways Contract contractor is not included on either of the frameworks, although there is opportunity for capital works to be carried out under this contract if maintenance performance is good.

6.3 The tenders will be assessed in terms of submitted prices and quality on the basis of 70/30 respectively for Framework 1 and 45/55 for Framework 2. Exact details of the quality element of the tenders have yet to be finalised, but will most likely include similar headings as the Term Highway Contract 2008-15/18, which were:

- (i) Organisational Arrangements
- (ii) Customer Focus
- (iii) Managing Performance
- (iv) Collaboration
- (v) Sustainability

The price:quality splits differ for the two frameworks, as Framework 1 will be based upon a price list of items, fixing prices for the entire period of the framework. Framework 2

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concentrates more closely on the added value that closer working with the supply chain can offer and, as such, is proposed to be biased more towards the selection of high class suppliers.

6.4 Detailed assessment of the quality and price submissions will take place independently during February/March 2008. Interviews will also be held with all Framework 2 contractors during March 2008, as the relationship required for this arrangement relies upon selection of contractors with whom the Council can develop best working relationships.

6.5 Following the completion of the tender assessments, a short list of contractors for inclusion on each framework will be selected and recommendation made to the Director of Environment, in conjunction with the Head of Corporate and Legal Services and the County Treasurer, to appoint them onto the respective contracts.

6.6 Following award, mobilisation of the two frameworks will take place during March/April 2008, ready for commencement of the new arrangements on 1 May 2008.

6.7 As of 1 May 2008 the Register of Approved Contractors for Highway Works will cease.

7. Impact Assessments

7.1 The new contract strategy, including the Improvement Works Framework 2008-12, has been developed considering the impact on the environment and equalities at all stages.

7.2 For all construction works and services delivered through the new IWF, particular emphasis will be placed on developing safe approaches to temporary works and traffic management. The opportunity to develop earlier contractor involvement under the new arrangements will be used to suitably influence this and the design of the permanent works.

8. Conclusions

8.1 It is proposed that two four-year frameworks, collectively known as the Improvement Works Framework be progressed as an integral part of the core strategic approach to highway construction contracts for the Environment Department.

8.2 The new frameworks are written to allow for a flexible approach in terms of services, collaboration with others, funding levels and pricing/payment mechanisms, with a strong emphasis on customer focus.

8.3 The new frameworks incorporate a robust performance management framework aligned with key strategic objectives for the Environment Department and the County Council as a whole, aimed at providing a continuously improving highways service for the next four years.

LINK(S) TO CORPORATE STRATEGY		
	Yes	No
Hampshire safer and more secure for all	—	
Maximising well-being	—	
Enhancing our quality of place	—	

Section 100 D - Local Government Act 1972 - background papers

The following documents disclose facts or matters on which this report, or an important part of it, is based and has been relied upon to a material extent in the preparation of this report.

NB the list excludes:

<http://www.hants.gov.uk/decisions/decisions-docs/071009-execmb-R1002100520.html> 21/03/2011

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1. Published works.
2. Documents which disclose exempt or confidential information as defined in the Act.

TITLE	LOCATION
Construction Related Procurement Review within the Environment Department - 11 July 2006	Environment Department Room 410 Democratic Services
The Proposed Highways Contract Strategy Principles - 20 March 2007	Environment Department Room 410 Democratic Services

1340Rpt/PS

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Hampshire County Council, The Castle, Winchester, Hampshire, SO23 8UJ

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Hampshire County Council

Report to the Director of Environment

18 April 2008

Appointment of Suppliers to the Implementation Works Framework (Summary of Exempt Decision)

Contact: Phil Samms, tel 01962 874795 email: phil.samms@hants.gov.uk

1. Summary

1.1 The following decisions are sought:

(i) That the Director of Environment, based on the approved contract specification set out in the Authority to Tender report to the Executive Member for Environment on 9 October 2007, approves the appointment of Balfour Beatty Infrastructure Services Limited, Caroway, Dyer and Butler Limited, Mildren Construction Limited, Graham Moyse Contractors and Rocon Contractors Limited to Framework 1 of the Improvement Works Framework 2008–2012, for service commencement on 1 May 2008.

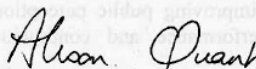
(ii) That the Director of Environment, based on the approved contract specification set out in the Authority to Tender report to the Executive Member for Environment on 9 October 2007, approves the appointment of Colas Limited, Caroway, Dyer and Butler Limited, Mildren Construction Limited, Geoffrey Osborne Limited and Tarmac Limited to Framework 2 of the Improvement Works Framework 2008–2012, for service commencement on 1 May 2008.

2. Reason

2.1 The current Register of Approved Contractors for Highway Works expires on 30 April 2008 and the new framework arrangements need to be awarded in order to achieve seamless service delivery of capital improvement schemes.

2.2 The decision will enhance delivery of highway maintenance and improvement services within Hampshire, improving public perception and ensuring robust management of performance and continuous improvement.

2.3 This report summarises the outcome of the procurement process for tendering the Improvement Works Framework (IWF), which will run for a period of four years from 1 May 2008. The IWF consists of two framework arrangements, as follows:

	<p>(i) Framework 1 – Highway Works up to a value of £500,000;</p> <p>(ii) Framework 2 – Structures Works from £50,000 and larger scale Highway Works (>£500,000), up to the European Union procurement limit for works (currently £3.6 million).</p>
2.4	<p>The procurement process for Framework 1 involved the assessment of tenders from 12 contractors, following a tender short-listing process that eliminated two of the companies that had submitted expressions of interest. Framework 2 invited tenders from 10 contractors following a similar short-listing process. The tender assessment was conducted on the basis of both price and quality elements of the tender, with the price element contributing to 70% of the total marks available on Framework 1 and 45% on Framework 2.</p>
3.	<p>Other Options Considered and Rejected</p>
3.1	<p>To accept other compliant tenders; however the tender assessments for both frameworks were based upon price and quality. The highest 6 scores for Framework 1 and 5 scores for Framework 2, from the published evaluation framework, were achieved by the proposed contractors. Not to award the contract in accordance with the evaluation methodology would be legally challengeable.</p>
3.2	<p>The published evaluation framework permitted 4 to 6 suppliers on Framework 1, and 4 or 5 suppliers on Framework 2. Consequently, fewer suppliers could have been appointed onto either framework. Scores were, however, reasonably close on both frameworks, and it was felt that the quality of suppliers warranted the selection of the maximum number permissible in both cases. In addition, utilising the maximum number also provide some 'future-proofing' in the event that any suppliers drop out of the arrangements before 2012 for whatever reason.</p>
4.	<p>Conflicts of Interest Declared by the Decision Maker or Other Executive Member Consulted – None.</p>
5.	<p>Dispensation granted by the Standards Committee – None.</p>
6.	<p>Reason(s) for the Matter being dealt with if Urgent – None.</p>
<p>Approved by:</p>	<p>Date: 17 April 2008</p>
<p> Alison Quant Director of Environment 1634Decn/PS</p>	
<p>2</p>	

Hampshire County Council

Report to the Director of Environment

18 April 2008

Appointment of Suppliers to the Implementation of Works Framework (Exempt)

Not for publication by virtue of Paragraph 3 of Part 1 of Schedule 12A of the Local Government Act 1972

Contact: Phil Samms, tel 01962 874795

email: phil.samms@hants.gov.uk

This report is not for publication as it contains exempt information within Paragraph 3 of Part 1 of Schedule 12A to the Local Government Act 1972, being information relating to the financial or business affairs of any particular person (including the authority holding that information). Further, it is considered that, in all the circumstances, the public interest in maintaining this exemption outweighs the public interest in disclosing this information. While there may be a public interest in disclosing this information, namely it would offer transparency on the tender assessment process, it is felt that, on balance, this is outweighed by other factors in favour of maintaining the exemption, namely the sensitive and commercial in confidence nature of the information the report contains.

1. Summary

1.1 This report summarises the outcome of the procurement process for tendering the Improvement Works Framework (IWF), which will run for a period of four years from 1 May 2008. The IWF consists of two framework arrangements, as follows:

- (i) **Framework 1** -- Highway Works up to a value of £500,000;
- (ii) **Framework 2** -- Structures Works from £50,000 and larger scale Highway Works (>£500,000), up to the European Union procurement limit for works (currently £3.6 million).

1.2 The procurement process for Framework 1 involved the assessment of tenders from 12 contractors, following a tender short-listing process that eliminated two of the companies that had submitted expressions of interest. Framework 2 invited tenders from 10 contractors following a similar short-listing process. The tender assessment was conducted on the basis of both price and quality elements of the tender, with the price element contributing to 70% of the total marks available on Framework 1 and 45% on Framework 2.

1.3	The assessment of the tenders was conducted by a Price Assessment Panel and Quality Assessment Panel, each working independently of the other to ensure unbiased scoring.
1.4	Framework 2 tenders were subjected to further assessment through interviews with all tenderers to clarify the scores attained from initial assessments of the quality submissions.
2.	Recommendations
2.1	That the Director of Environment, based on the approved contract specification set out in the Authority to Tender report to the Executive Member for Environment on 9 October 2007, approves the appointment of Balfour Beatty Infrastructure Services Limited, Caroway, Dyer and Butler Limited, Mildren Construction Limited, Graham Moyse Contractors and Rocon Contractors Limited to Framework 1 of the Improvement Works Framework 2008–2012, for service commencement on 1 May 2008.
2.2	That the Director of Environment, based on the approved contract specification set out in the Authority to Tender report to the Executive Member for Environment on 9 October 2007, approves the appointment of Colas Limited, Caroway, Dyer and Butler Limited, Mildren Construction Limited, Geoffrey Osborne Limited and Tarmac Limited to Framework 2 of the Improvement Works Framework 2008–2012, for service commencement on 1 May 2008.
3.	Introduction
3.1	The Improvement Works Framework was the subject of two separate Contract notices for Frameworks 1 and 2 in accordance with the European Procurement Directives during March/April 2007. Authority to proceed with the full tender was approved by the Executive Member for Environment on 9 October 2007.
3.2	Expressions of interest were received by 55 companies over the two frameworks following the contract notice period. Short-listing for full tender was determined on the basis of a Pre-Qualification phase.
3.3	The six week tender period commenced 10 January 2008, with the tender documents issued to all tenderers at a specially convened briefing session. Tenders were returned on 20 February 2008 for Framework 1 and the following day for Framework 2.
3.4	Twelve tenders were received for Framework 1 and ten for Framework 2. The tendered prices were separated from the quality submission and from that point made available only to the Price Assessment Panel. Copies of the quality submissions were distributed to each member of the respective Quality Assessment Panels for individual scoring. Scores were assigned for each of the five sections of the quality submission, as identified in the
4	

Authority to Tender report of 9 October 2007. The individual scores were then consolidated through a meeting of the complete Quality Assessment Panel for each Framework and a score agreed for each tenderer.

Framework 1

3.5 Framework 1 quality scores were then combined with the price scores calculated by the Price Assessment Panel to identify the final combined scores and ultimate ranking. These are summarised below:

Framework 1 – Combined Price/Quality Scores					
1	2	3	4	5	6
Tender	Quality Mark	30% of (2)	Financial Mark	70% of (4)	Aggregate (3) + (5)
A	86	26	100	70	96
B	59	18	93	65	83
C	100	30	73	51	81
D	69	21	84	59	80
E	95	29	59	41	70
F	58	17	76	53	70
G	84	25	52	36	61
H	44	13	67	47	60
I	71	21	55	39	60
J	61	18	58	41	59
K	44	13	43	30	43
L	44	13	41	29	42

3.6 Framework 1 was advertised as requiring between 4 and 6 suppliers to cover the workload. The final combined scores shown above indicate a clear split between 4th/5th placed and 6th/7th placed suppliers. The Tender Assessment Panel felt that it was prudent to appoint six suppliers to the framework at this time, to allow for possible losses from the original number if workload pressures or other situations arose in the next four years. The proposed six tenderers are highlighted in bold, and were (in alphabetical order):

- Balfour Beatty Infrastructure Services Limited
- Caroway
- Dyer and Butler Limited
- Graham Moyse Contractors
- Mildren Construction Limited
- Rocon Contractors Limited.

Framework 2

3.7 The Framework 2 tender assessment involved a more in-depth quality submission from the tenderers, and was therefore subjected to a further process of assessment involving an interview with all tenderers. Issues highlighted from the initial assessments of their quality submissions were documented and questions for each tenderer agreed-in advance by the interview panel.

3.8 Interviews for the ten tenderers were held over two days on 11 and 12 March 2008. Each tenderer was allowed 15 minutes for presentations, followed by a 45 minutes question and answer session, using the questions agreed before the interview stage. Following the interviews, the Quality Assessment Panel met to determine if any scores should be adjusted on the basis of the interview findings. Following agreement of the quality scores the price element of the tenders was disclosed to the Quality Assessment Panel so that a combined price/quality score could be determined for each tenderer. These are summarised below:

Framework 2 – Combined Price/Quality Scores					
1	2	3	4	5	6
Tender	Quality Mark	55% of (2)	Financial Mark	45% of (4)	Aggregate (3) + (5)
A	96	53	100	45	98
B	95	52	90	41	93
C	82	45	100	45	90
D	100	55	70	32	87
E	97	53	70	32	85
F	76	42	90	41	83
G	75	41	90	41	82
H	73	40	40	18	58
I	42	23	70	32	55
J	53	29	40	18	47

3.9 Framework 2 was advertised as requiring 4 or 5 suppliers to cover the workload. The final combined scores shown above indicate close scoring between 4th and 7th placed suppliers. The tender assessment panel felt, once again, that it was prudent to appoint five suppliers for similar reasons to Framework 1. The proposed five tenderers are highlighted in bold, and were (in alphabetical order):

- Colas Limited
- Dyer and Butler Limited
- Mildren Construction Limited
- Geoffrey Osborne Limited
- Tarmac Limited.

Standstill Period

- 3.10 In line with the European Union Procurement Directives, each of the tenderers for both frameworks has been advised of their evaluated marks as set out in the tables above. In addition, opportunity has been given for each tenderer to receive additional information in respect of the characteristics and relative advantages of the successful tenders, so as to satisfy themselves that the due process has been followed.
- 3.11 In line with the standstill period arrangements, no challenges to the proposal to appoint suppliers to the two frameworks have been received by the end of the period. As such, there are no legal reasons why the suppliers as detailed above should not be appointed onto the respective frameworks.

4. Impact Assessments

- 4.1 The new contract strategy, including the Improvement Works Framework, has been developed considering the impact on the environment and equalities at all stages.
- 4.2 The tender assessment criteria included specific sections for both the environment and equalities. Therefore the impact in these areas was factored into the final contract award recommendation.

5. Conclusion

- 5.1 It is proposed that Balfour Beatty Infrastructure Services Limited, Caroway, Dyer and Butler Limited, Mildren Construction Limited, Graham Moyse Contractors and Rocon Contractors Limited be appointed to Framework 1 of the Improvement Works Framework 2008–2012 as an integral part of the core strategic approach to highway construction contracts for the Environment Department.
- 5.2 It is further proposed that Colas Limited, Caroway, Dyer and Butler Limited, Mildren Construction Limited, Geoffrey Osborne Limited and Tarmac Limited be appointed to Framework 2 of the Improvement Works Framework 2008–2012 as an integral part of the core strategic approach to highway construction contracts for the Environment Department.

LINK(S) TO CORPORATE STRATEGY

	Yes	No
Hampshire safer and more secure for all	✓	
Maximising well-being	✓	
Enhancing our quality of place	✓	

The following documents disclose facts or matters on which this report, or an important part of it, is based and has been relied upon to a material extent in the preparation of this report.

1. Published works.
2. Documents which disclose exempt or confidential information as defined in the Act.

None.

8

Appendix 3: Example of supplier performance report

Hampshire County Council

Highways and Transportation

Improvement Works Framework 1

Performance report for Q4 2009/10: Caroway

Introduction

This is a report of performance for Caroway on Improvement Works Framework 1 (IWF 1) for the 4th quarter of financial year 2009/10 (January to March 2010).

The report includes actual performance against the Key Performance Indicators (KPI) written into the contract document as well as 'standardised' performance figures that are used to determine placement in the three performance 'zones' in the contract. Placement in these performance zones affects competitiveness when tendering for future Work Packages.

KPI Performance

KPI	Actual Score	Standardised Score
Right First Time	-	-
Variation of Time	-	-
Accuracy of Payment Submission	100	100
Site H&S Inspections	-	-
Construction Waste Recycling Rate	0	0
Fleet CO ₂ Emissions	30.5	23

Overall

67

The 'null' scores for 'Right First Time' and 'Variation of Time' are due to Caroway not completing any schemes in the period being reported.

The zero score for Construction Waste Recycling Rate is due to no data being supplied to HCC by Caroway for this KPI

Actual Scores are converted to the 'standardised' scale (0 – 100) using the method described in Section 4.6 of the Framework Contract document.

KPI data used for calculation of KPI for Right First Time, Variation of Time and Accuracy of Payment Submission against the company's active projects in this period are shown as appendices to this report.

Also included are summarised reports of any site H&S inspections performed in the period as well as HCC Site Staff satisfaction scores.

Appendix 4: Pilot questionnaire

Name.....

Organisation.....



Anglia Ruskin
University



Hampshire
County Council

Framework Research

Pilot Questionnaire

October 2010

This pilot questionnaire has been compiled to assist with the research project entitled 'Performance Improvements within Construction frameworks'. The information collected will be used to identify your views about construction frameworks and allow areas of improvement to be identified.

Your views will remain confidential and the data collected will be published without reference to any individual.

Please refer to the research participation sheet for further details.

Helpful hints for completing this questionnaire:

Please read the question carefully and tick boxes as indicated for your answers

Once you have completed the questionnaire please return this survey to Keith Gale

Q1	Which organisation are you involved with? (Please tick ✓ one only)	
	Hampshire County Council – Design section	<input type="radio"/>
	Hampshire County Council – Supervision section	<input type="radio"/>
	Framework supplier for Hampshire County Council	<input type="radio"/>
	Other (please specify)	

Q2	Which profession are you allied to? (Please tick ✓ one only)	
	Engineer on behalf of Client – design function	<input type="radio"/>
	Engineer on behalf of Client – supervision function	<input type="radio"/>
	Quantity surveyor – on behalf of Client	<input type="radio"/>
	Quantity Surveyor – on behalf of supplier	<input type="radio"/>
	Engineer – on behalf of supplier	<input type="radio"/>
	Contracts Manager on behalf of supplier	<input type="radio"/>
	Other (please specify)	

Q3	Are you involved in any way with the HCC frameworks? (Please tick ✓ one only)	Yes	<input type="radio"/>
		No	<input type="radio"/>

Q4	Have you been involved in any way with HCC highways contracts prior to the frameworks? (Please tick ✓ one only)	Yes	<input type="radio"/>
		No	<input type="radio"/>

Q5	Are you involved in marking of key performance indicators or do you supply information for key performance indicators? (Please tick ✓ one only)	Yes	<input type="radio"/>
		No	<input type="radio"/>

Q6	<p>The purpose of this pilot questionnaire is to gain your views regarding cultural behaviour characteristics to gain performance outcomes with collaborative methods such as framework agreements.</p> <p>The list of behaviour characteristics below has been identified in construction research as the ten most effective behaviours to contribute positive performance in projects.</p> <p>In your opinion, which are the four most effective behaviour characteristics to gain positive performance with framework agreement?</p> <p>(Please tick ✓ four only)</p>	
	Communication	<input type="radio"/>
	Trust and confidence	<input type="radio"/>
	Empowerment	<input type="radio"/>
	Effective incentive system	<input type="radio"/>
	Diversity	<input type="radio"/>
	Motivation	<input type="radio"/>
	Knowledge transfer	<input type="radio"/>
	Relationships	<input type="radio"/>
	Satisfaction	<input type="radio"/>
	Decision making	<input type="radio"/>

Date Completed:

Many thanks for taking the time to complete this pilot survey – your contribution to this research is vital and really appreciated.

Results from pilot questionnaire

Pilot questionnaire results										
	Q 1	Q 2	Q 3	Q 4	Q 5	Communication	Trust	Empowerment	Incentives	Diversity
	1 2 1 1 2 3 3 2 1 1 3 3 2 2 1 1 2 2 3 1	1 2 1 1 3 5 6 2 1 1 5 5 2 2 1 1 2 2 6 1	1 1 2 1 1 1 1 1 1 2 1 1 1 1 1 1 2 1 1	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2 1 2 2 1 2 2 1 1 1 1 1 1 1 1 1 2 1	✓	✓	✓	✓	✓
	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Communication	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Trust	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Empowerment	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Incentives	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Diversity	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Motivation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Knowledge	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Relationships	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Satisfaction	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Decisions	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	3	13	15	3	11	2	12	7	8	6

Appendix 5: Framework questionnaire

Name.....Wendy Wright.....

Organisation.....HCC Design.....



Anglia Ruskin
University



Hampshire
County Council

Framework Research

Stakeholder Survey

November 2010

This questionnaire has been compiled to assist with the research project entitled 'Performance Improvements within Construction frameworks'. The information collected will be used to identify your views about construction frameworks and allow areas of improvement to be identified.

Your views will remain confidential and the data collected will be published without reference to any individual.

Please refer to the research participation sheet for further details.

In this questionnaire the term 'frameworks' or 'HCC frameworks' is defined as frameworks in the context of Improvement Works Framework 1 and Improvement Works Framework 2 of Hampshire County Council.

Reference to the term 'traditional procurement' is defined as the individual selection of a supplier outside of a framework.

Helpful hints for completing this questionnaire:

Please read each question carefully and tick a box to indicate your answer

In this questionnaire, your response to all of the questions will only need a tick in one of the boxes

Once you have completed the questionnaire please return this survey to Keith Gale

Q1	Which organisation are you involved with? (Please tick ✓ one only)	
	Hampshire County Council – Design section	<input checked="" type="checkbox"/>
	Hampshire County Council – Supervision section	<input type="checkbox"/>
	Framework supplier for Hampshire County Council	<input type="checkbox"/>
	Other (please specify)	

Q2	Which profession are you allied to? (Please tick ✓ one only)	
	Engineer on behalf of Client – design function	<input checked="" type="checkbox"/>
	Engineer on behalf of Client – supervision function	<input type="checkbox"/>
	Quantity surveyor – on behalf of Client	<input type="checkbox"/>
	Quantity Surveyor – on behalf of supplier	<input type="checkbox"/>
	Engineer – on behalf of supplier	<input type="checkbox"/>
	Contracts Manager on behalf of supplier	<input type="checkbox"/>
	Other (please specify)	

Q3	Are you involved in any way with the HCC frameworks? (Please tick ✓ one only)	Yes	<input checked="" type="checkbox"/>
		No	<input type="checkbox"/>

Q4	Have you been involved in any way with HCC highways contracts prior to the frameworks? (Please tick ✓ one only)	Yes	<input type="checkbox"/>
		No	<input checked="" type="checkbox"/>

Q5	Are you involved in marking of key performance indicators or do you supply information for key performance indicators? (Please tick ✓ one only)	Yes	<input type="checkbox"/>
		No	<input checked="" type="checkbox"/>

Q6	In your opinion, which procurement method encourages the supplier to start on time? (Please tick ✓ one only)	
	Frameworks (1 and 2) gives the most consistent starting date	<input type="checkbox"/>
	Traditional procurement methods give the most consistent starting date	<input type="checkbox"/>
	The procurement method does not make any difference to starting dates	<input checked="" type="checkbox"/>

Q7	In your opinion, which procurement method encourages the supplier to finish on time? (Please tick ✓ one only)	
	Frameworks (1 and 2) gives the most consistent completion date	<input checked="" type="checkbox"/>
	Traditional procurement methods give the most consistent completion date	<input type="checkbox"/>
	The procurement method does not make any difference to completion dates	<input type="checkbox"/>

Q8	In your opinion, which procurement method produces fewer defects at completion of a project? (Please tick ✓ one only)
Frameworks (1 and 2) produces fewer defects at completion	<input type="radio"/>
Traditional procurement methods produces fewer defects at completion	<input type="radio"/>
The procurement method does not make any difference to the number of defects at completion	<input checked="" type="radio"/>

Q9	In your opinion, which procurement method receives the highest number of complaints from stakeholders about a project? (Please tick ✓ one only)
Frameworks (1 and 2) receive the highest number of complaints from stakeholders	<input type="radio"/>
Traditional procurement methods receive the highest number of complaints from stakeholders	<input type="radio"/>
The procurement method does not make any difference to the number of complaints	<input checked="" type="radio"/>

Q10	In your opinion, which procurement method allows the strongest relationship between parties to a construction project? (Please tick ✓ one only)
Frameworks (1 and 2) allow stronger relationships between the parties	<input checked="" type="radio"/>
Traditional procurement methods allows stronger relationships between the parties	<input type="radio"/>
The procurement method does not make any difference to the strength of relationships	<input type="radio"/>

Q11	In your opinion, which procurement method allow for closer relationships between parties to a construction project? (Please tick ✓ one only)
Frameworks (1 and 2) allow closer relationships between the parties	<input checked="" type="radio"/>
Traditional procurement methods allows closer relationships between the parties	<input type="radio"/>
The procurement method does not make any difference to the closeness of relationships	<input type="radio"/>

Q12	In your opinion, which procurement method encourages longer term relationships between parties to a construction project? (Please tick ✓ one only)
Frameworks (1 and 2) allow longer term relationships between the parties	<input type="radio"/>
Traditional procurement methods allow longer term relationships between the parties	<input type="radio"/>
The procurement method does not make any difference to the length of relationships	<input checked="" type="radio"/>

Q13	In your opinion, which procurement method allows the parties to a construction contract to work together better ? (Please tick ✓ one only)
Frameworks (1 and 2) allow parties to work together better	<input checked="" type="radio"/>
Traditional procurement methods allow parties to work together better	<input type="radio"/>
The procurement method does not make any difference to the working relationship	<input type="radio"/>

Q14	In your opinion, which procurement method gives stakeholders with the most 'end user satisfaction' ? (Please tick ✓ one only)
Frameworks (1 and 2) provides stakeholders with the most 'end user satisfaction'	<input type="radio"/>
Traditional procurement methods provide stakeholders with the most 'end user satisfaction'	<input type="radio"/>
The procurement method does not make any difference to 'end user satisfaction'	<input checked="" type="radio"/>

Q15	In your opinion, which procurement method encourages accurate planning of resources in a construction project? (Please tick ✓ one only)
Frameworks (1 and 2) encourages accurate planning of resources	<input type="radio"/>
Traditional procurement methods encourages accurate planning of resources	<input type="radio"/>
The procurement method does not make any difference to accurate planning of resources	<input checked="" type="radio"/>

Q16	Which methods do you think provides an equal balance of risks to participants in construction projects? (Please tick ✓ one only)
Traditional procurement methods provide an equal balance of risks	<input type="radio"/>
Framework procurement methods provide an equal balance of risks	<input type="radio"/>
The procurement method does not make any difference towards balance of risks	<input checked="" type="radio"/>

Q17	Which method do you think encourages positive performance in construction projects? (Please tick ✓ one only)
Neither traditional methods nor frameworks encourage positive performance	<input type="radio"/>
Traditional procurement methods encourage positive performance	<input type="radio"/>
Framework procurement methods encourage positive performance	<input checked="" type="radio"/>
The method makes no difference to performance	<input type="radio"/>

Questions 18 to 39 asks you for your views on each of the following statements:

Q18	Construction frameworks reduces the competitiveness of tenders because there are fewer suppliers (Please tick ✓ one only)				
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Not applicable
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q19	Traditional procurement obtains lower tender prices than frameworks due to increased competition (Please tick ✓ one only)				
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Not applicable
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q20	More management is required for construction projects procured using frameworks (Please tick ✓ one only)				
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Not applicable
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q21	Frameworks encourage continuous improvement due to the longer term relationships between participants (Please tick ✓ one only)				
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Not applicable
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q22	Communication between participants is clearer with traditional projects (Please tick ✓ one only)				
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Not applicable
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q23	Decision making is more effective with framework projects (Please tick ✓ one only)				
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Not applicable
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q24	Knowledge transfer is more effective when using traditional projects (Please tick ✓ one only)				
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Not applicable
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q25	Frameworks are more effective when using incentives between parties (Please tick ✓ one only)				
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Not applicable
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q26	Using target cost contracts is not effective (Please tick ✓ one only)				
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Not applicable
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q27	Frameworks encourage closer communication between participants in a project (Please tick ✓ one only)				
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Not applicable
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q28	Frameworks are too complicated to use (Please tick ✓ one only)				
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Not applicable
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q29	Frameworks encourage trust (Please tick ✓ one only)				
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Not applicable
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q30	Traditional procurement encourages empowerment because the methods are understood by participants (Please tick ✓ one only)				
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Not applicable
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q31	Frameworks encourage higher standards of health and safety due to longer term relationships (Please tick ✓ one only)				
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Not applicable
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q32	Traditional methods clearly define the levels of health and safety necessary on a project (Please tick ✓ one only)				
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Not applicable
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q33	Frameworks encourage higher standards of site welfare due to the longer term relationships (Please tick ✓ one only)				
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Not applicable
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q34	Traditional methods allow variations to be agreed quickly (Please tick ✓ one only)				
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Not applicable
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q35	Diversity is more effective with frameworks when compared with traditional methods (Please tick ✓ one only)				
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Not applicable
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q36	Satisfaction is easier to attain in traditional contracts than with frameworks (Please tick ✓ one only)				
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Not applicable
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q37	Motivation is easier to attain in frameworks than in traditional contracts (Please tick ✓ one only)				
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Not applicable
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q38	Using detailed construction programmes is an essential part of effective management with the frameworks (Please tick ✓ one only)				
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Not applicable
<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q39	The requirement for updating construction programmes with the frameworks is a waste of resources (Please tick ✓ one only)				
Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Not applicable
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q40	Do you feel that we should continue the use of frameworks in the future when the current ones expire in 2012? (Please tick one only)	Yes	<input checked="" type="checkbox"/>
		No	<input type="checkbox"/>



Q41	Do you feel that the use of incentives to encourage good performance within frameworks is worthwhile? (Please tick one only)	Yes	<input checked="" type="checkbox"/>
		No	<input type="checkbox"/>

Q42	Would you be prepared to meet and discuss your responses to this survey to help with further research? (Please tick <input checked="" type="checkbox"/> one only)	
	Yes, I am willing to assist with additional research	<input checked="" type="checkbox"/>
	No thanks	<input type="checkbox"/>
<p>Please use this space for any comments you may have regarding this questionnaire: I am involved on a framework contract for the first time so lack experience of them. However, from what I've heard about them and based on my experience so far I think it seems to be a good system with many benefits to all. Some of my answers above may change after further experience, however!</p>		

Date Completed: 23/11/10

Many thanks for taking the time to complete this survey – your contribution to this research is vital and really appreciated.

Appendix 6: Interview schedule

 Anglia Ruskin University		 Hampshire County Council	
<h1>Framework Research</h1> <h2>Interview Schedule</h2> <h3>May 2011</h3>			
<p>This interview schedule has been compiled to assist with the collection of views collected for a research project entitled 'Performance Improvements within Construction frameworks'. The information collected will be used to identify views about construction frameworks and allow areas of improvement to be identified.</p> <p>The views will remain confidential and data collected will be published without reference to any individual. Quotations from individuals may be published – provided permission is given by the person concerned – otherwise the views will be on a 'non-attributable' basis.</p> <p>Interviewees will be given a consent sheet and research participation sheet for exact details.</p> <p>In this schedule the term 'frameworks' or 'HCC frameworks' is defined as frameworks in the context of Improvement Works Framework 1 and Improvement Works Framework 2 of Hampshire County Council.</p> <p>Reference to the term 'traditional procurement' is defined as the individual selection of a supplier outside of a framework.</p>			
<p>© Keith Gale</p> <p style="text-align: center;">- 1 -</p>			

Q1	Which organisation are you involved with? (Record name)	
	Hampshire County Council – Design section	<input type="radio"/>
	Hampshire County Council – Supervision section	<input type="radio"/>
	Framework supplier for Hampshire County Council	<input type="radio"/>
	Other (please specify)	

Q2	Which profession are you allied to?	
	Engineer on behalf of Client – design function	<input type="radio"/>
	Engineer on behalf of Client – supervision function	<input type="radio"/>
	Quantity surveyor – on behalf of Client	<input type="radio"/>
	Quantity Surveyor – on behalf of supplier	<input type="radio"/>
	Engineer – on behalf of supplier	<input type="radio"/>
	Contracts Manager on behalf of supplier	<input type="radio"/>
	Other (please specify)	

Q3	Are you involved in any way with the HCC frameworks?	Yes <input type="radio"/>	No <input type="radio"/>
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Q4	Have you been involved in any way with HCC highways contracts prior to the frameworks?	Yes <input type="radio"/>	No <input type="radio"/>
-----------	--	---------------------------	--------------------------

Q5	Are you involved in marking of key performance indicators or do you supply information for key performance indicators?	Yes <input type="radio"/>	No <input type="radio"/>
-----------	--	---------------------------	--------------------------

Q6	In your view, what are the drivers that encourage suppliers to start on time?
-----------	---

Q7	In your view, what are the drivers that encourage suppliers to finish on time?
-----------	--

Q8	In your view, what can be done to encourage suppliers to start and finish on time?
-----------	--

Q9	In your opinion, do you think that frameworks encourage accurate start and finish dates more than traditional procurement method? Why do you think that is?
-----------	---

Q10	In your view, what are the drivers that encourage stronger and closer relationships between parties to a construction project? Why do you think that is?
------------	--

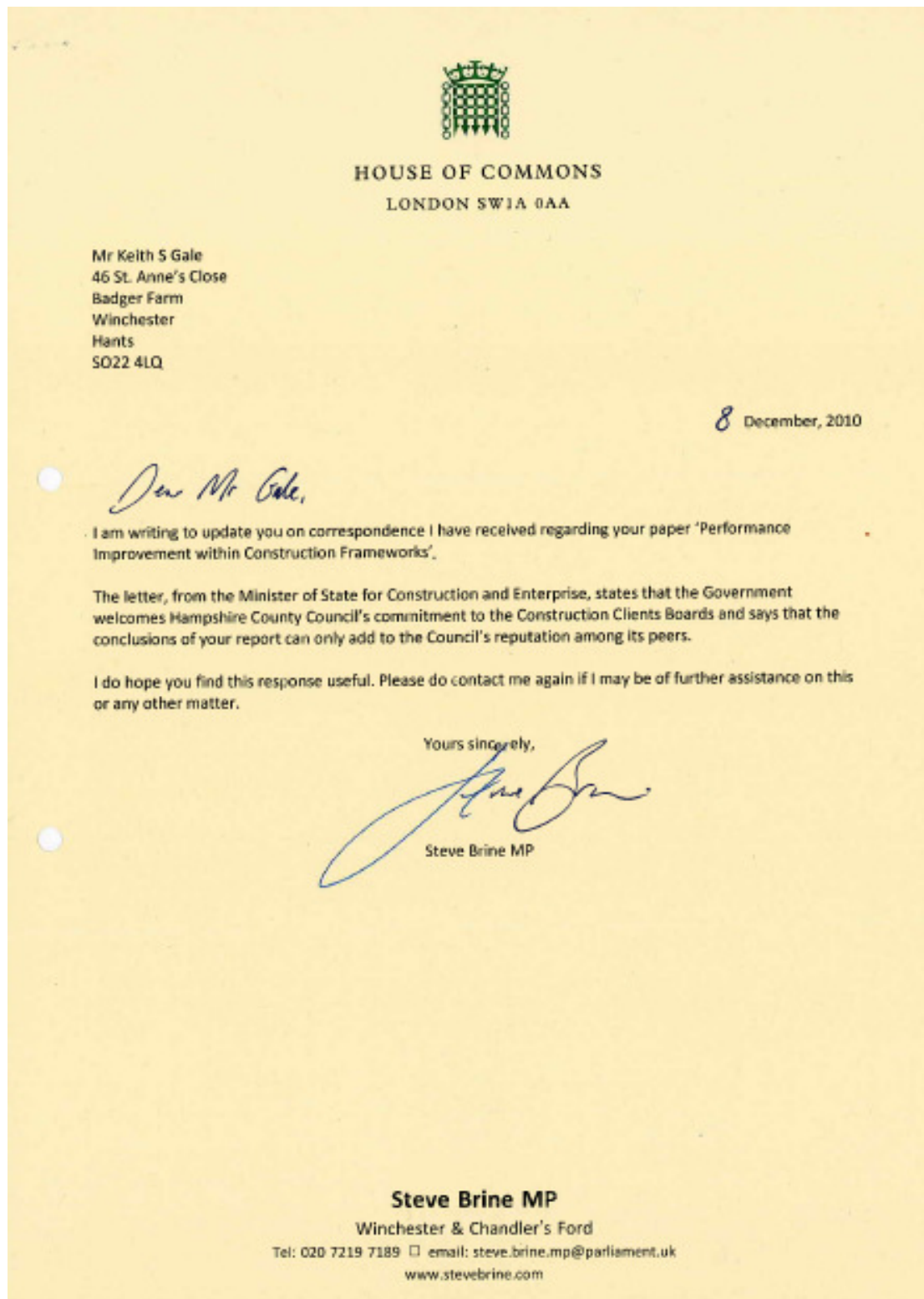
Q11	In your opinion, what are the drivers that encourage projects to be completed 'right first time'? Does the procurement help or hinder this?
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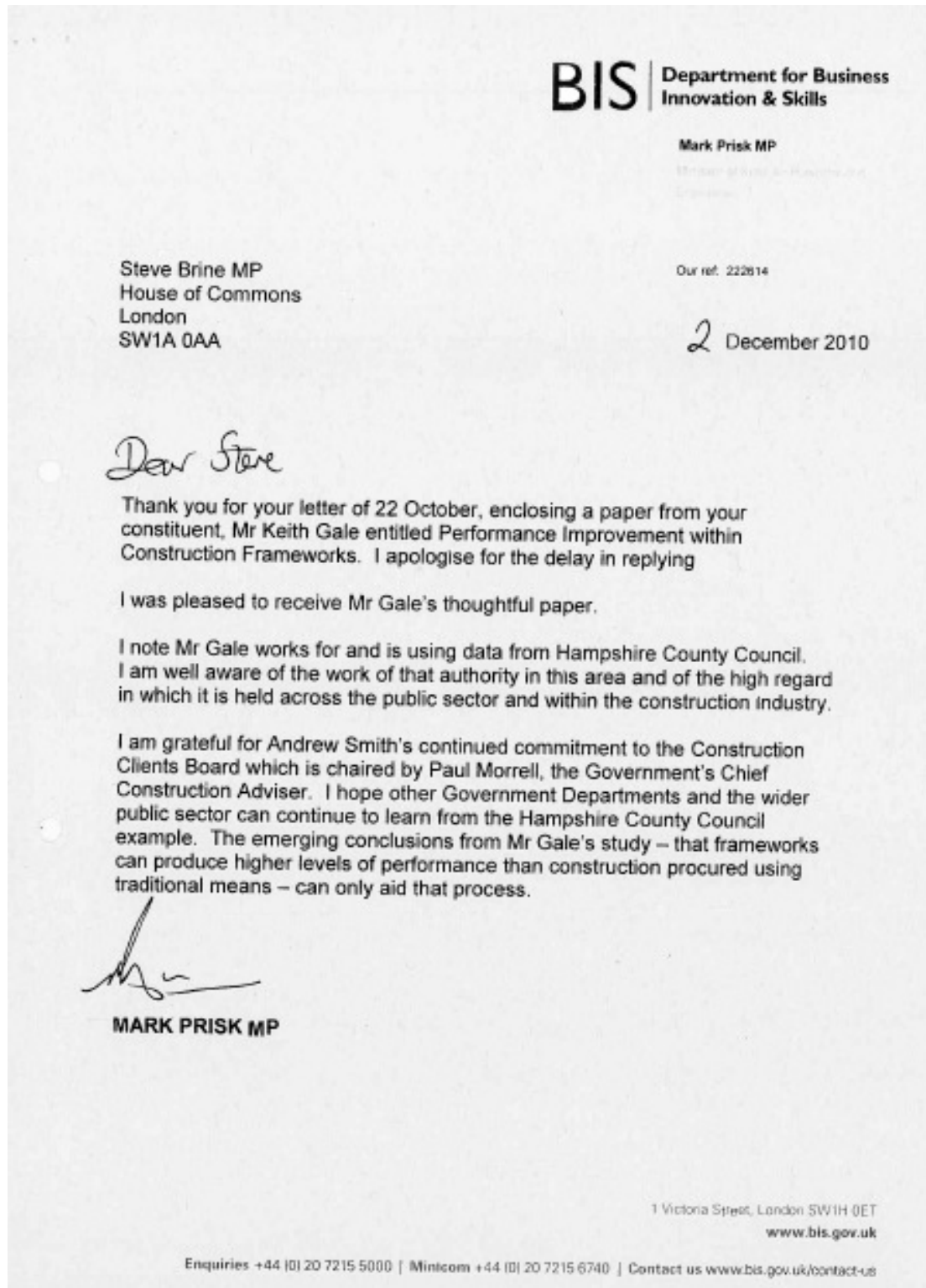
Q12	In your opinion, which procurement method encourages longer term relationships between parties to a construction project? Why do you think this is?		
Q13	In your view, does the use of key performance indicators help the parties gain better performance with projects? Why do you think this is?		
Q14	In your opinion, is the collection of key performance data worthwhile? Is it demanding?		
Q15	In your view, does the use of a framework help with the balance of risk allocation? Why do you think it is?		
Q16	Which method (traditional verses framework) do you think provides the most effective communication between participants in construction projects? Why do you feel this?		
Q17	Which method (traditional verses framework) do you think allows financial control of a project to be used most effectively? Why do you feel this is so?		
Q18	Do you feel that we should continue the use of frameworks in the future when the current ones expire in 2012?	Yes	<input type="radio"/>
		No	<input type="radio"/>
Q19	Do you feel that the use of incentives to encourage good performance within frameworks is worthwhile? Do you have views as to what these incentives should comprise?	Yes	<input type="radio"/>
		No	<input type="radio"/>

Date Completed:

Many thanks for taking the time to be involved with this interview – your contribution to this research is vital and really appreciated.

Appendix 7: Reaction from Central Government towards this research





Appendix 8: Examples of contractual information used in data collection

<p>Dyer & Butler Ltd Mead House Station Road Nursling Southampton SO16 0AH</p>		<p>Environment Department The Castle, Winchester Hampshire SO23 8UD Tele: 0845 603 5638 (General Enquiries) 0845 603 5633 (Roads and Transport) 0845 603 5634 (Recycling Waste & Planning) Textphone 0845 603 5625 Fax 01962 847055 www.hants.gov.uk</p>	
Enquiries to	M Elton	My reference	EC/CJ005417.01/ME/01
Direct Line	07718 146080	Your reference	_____
Date	14 July 2010	E-mail	marc.elton@hants.gov.uk

Dear Sirs

Abbey Water Retaining Wall, Romsey


You are hereby formally notified that in accordance with Clause 14.2 of the NEC Engineering and Construction Contract, I delegate the actions of the Project Manager and Supervisor to:

Andy Mabey
Marc Elton


Such delegation is not given in respect of any decisions to be taken or certificates to be issued under Clauses 30.2, 90, and main option clause W2


The starting date for the contract is 9 August 2010 and the completion date is 29 October 2010.

Yours faithfully



Colin Taylor
Assistant Director (Highways and Transport)

 Certificate No. 15 2186	Chief Executive – Common Law Contracts Head of Contracts: K Gale Design Engineer: J MacGregor Contracts Manager: A Mabey Supervising Engineer: M Elton	Chief Engineer Hampshire Highways West Contract Clerk: S Peach Quantity Surveyor: J Laing Asset Manager: I. Davidson
--	---	---


 INVESTOR IN PEOPLE

Director of Environment
Stuart Jarvis BSc DipTP FCINT MRTF

<p>Dyer & Butler Mead House Station Road Nursling Southampton SO16 0AH</p>		<p>Environment Department The Castle, Winchester Hampshire SO23 8UD Tele: 0845 603 5638 (General Enquiries) 0845 603 5633 (Roads and Transport) 0845 603 5634 (Recycling Waste & Planning) Textphone 0845 603 5625 Fax 01962 847055 www.hants.gov.uk</p>	
Enquiries to	M Elton	My reference	EC/CJ005417.01/ME/02
Direct line	07718 146080	Your reference	_____
Date	3 November 2010	E-mail	marc.chen@hants.gov.uk

Dear Sirs

Abbey Water Retaining Wall, Romsey

Certificate of Completion

In accordance with Clause 30.2 of the NEC Engineering and Construction Contract I hereby certify that the whole of the works included in the above named Contract were completed on 29 October 2010.


The defects date will be 28 October 2011.


This certificate is issued on the understanding that any defects will be satisfactorily corrected in accordance with Clause 43 of the NEC Engineering and Construction Contract.

Yours faithfully



Colin Taylor
Assistant Director (Highways and Transport)

 Certificate No 75 31845	Chief Executive – Common Law Contracts Head of Contracts : K Gale Design Engineer : J MacGregor Contracts Manager : A Mabey Supervising Engineer : M Elton	Chief Engineer Hampshire Highways West Contract Clerk : S Peach Quantity Surveyor : Asset Manager: L Davidson
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 INVESTOR IN PEOPLE

Director of Environment
Stuart Jarvis BSc DipTP FCIMT MRTF

Datasheet: IWF 1 Right First Time report Page 1 of 2

IWF 1 Right First Time report				
Drag a column header and drop it here to group by that column				
Name	Project Reference	Company	Date Assessed	Answer
09/10 Casualty Reduction Partnership	C.J005466.01	Rocon	09/12/2009	Yes
A30 Old Greywell Road, Old Basing - Lighting	C.J005006.01	Caroway	13/09/2010	Yes
A30/ Huish Lane, Basingstoke - Jct Imp	C.J005416.01	Caroway	03/12/2009	Yes
A326 Safety Improvements (Twiggs Lane)	C.J005456.01	Graham Moyse Contractors	28/04/2010	No
A337 Old Milton Green Pedestrian	C.J005135.01	Mildren Construction	15/05/2009	Yes
A340 Aldermaston Road - WIG WAG 250	R.J550133.04	Hampshire County Council Environment Dept	16/02/2009	Yes
A343 PORTWAY - PEDESTRIANS & CYCLES	C.J005470.01	Caroway	09/10/2009	Yes
A35 Colebury Pedestrian Crossing, Ashurst	C.J005336.01	Graham Moyse Contractors	26/06/2009	Yes
Amewood School, New Milton SRTS	C.J005519.01	Graham Moyse Contractors	26/02/2010	Yes
Ashburton Court Design (highways)	R.J509633.02	Mildren Construction	28/05/2009	Yes
Ashburton Court Design (Highways)	R.J509633.02A	Mildren Construction	28/11/2009	Yes
B2177 Winchester Rd/ Claylands Rd	R.J550138.09	Caroway	04/06/2010	Yes
B3272 Traffic Management - Eversley	C.J004772.01	Caroway	16/01/2009	Yes
Baycroft School Flood Repairs	R.J509616.01	Caroway	12/08/2009	No
Bishopswood Infant & Junior SRTS 09/10	C.J005462.01	Graham Moyse Contractors	12/03/2010	Yes
Botley Road Toucan Crossing	C.J005645.01	Graham Moyse Contractors	31/03/2010	No
Braishfield Primary SRTS	C.J005249.01	Dyer & Butler	11/11/2009	Yes
Bridge Road / Swanwick Lane	R.J550144.05	Caroway	23/08/2010	Yes
Broom Way Accessibility	C.J005115.01	Caroway	26/06/2009	
Bury Road, Gosport Ped Crossing	R.J550138.08	Rocon	26/03/2010	Yes
chilbolton avenue, Winchester - puffin	c.j005488	Caroway	04/09/2009	Yes
Compton All Saints - SRTS	C.J005606.01	Graham Moyse Contractors	06/08/2010	Yes
Decommissioning of Shepherds Spring	R.J509005.02	Graham Moyse Contractors	04/05/2010	Yes
Denmead to Waterlooville Cycle Route	C.J005486.01	Graham Moyse Contractors	11/06/2010	Yes
EC - TDU032 Rushington Rbt Refurb	R.J550138.06	Caroway	23/10/2009	Yes
Gudge Heath Lane, Fareham	R.J567521	Mildren Construction	14/03/2009	Yes
Harrow Way Community School SRTS	C.J005602.01	Graham Moyse Contractors	23/04/2010	Yes
Hawley Pedestrian Access Improvement	C.J005381.01	Rocon	09/10/2009	Yes
High Street, Fareham - Zebra Crossing	C.J005376.01	Graham Moyse Contractors	14/03/2009	Yes

<http://www.econtract.co.uk/Reportline/Reports/Report.aspx> 26/10/2010

		 Hampshire County Council	
		Environment Department The Castle, Winchester Hampshire SO23 8UD Tele: 0845 603 5638 (General Enquiries) 0845 603 5633 (Roads and Transport) 0845 603 5634 (Recycling Waste & Planning) Textphone 0845 603 5625 Fax 01962 847055 www.hants.gov.uk	
Rocon Contractors Ltd Vyne Lodge Farm Vyne Road Bramley Hampshire RG26 5DX			
Enquiries to	M Elton	My reference	CJ4696/ME/08
Direct Line	07718 146080	Your reference	_____
Date	23 July 2009	E-mail	marc.elton@hants.gov.uk

Dear Sirs

Bridge St/London St, Andover – Improvement Scheme

Final Determination of Extension of Time

In accordance with Clause 44(5) of the Conditions of Contract I reviewed the circumstances known to me and referred to in Clause 44(1) and now finally determine and certify that the overall extension of time that you are entitled to in respect of the works is 62 days.

The date for completion is therefore 6 July 2009.

Yours faithfully



S J Reynolds
 Assistant Director
 Highways and Transport

Copies to :

Chief Executive – Common Law Contracts Head of Contracts : K Gale Project Manager : N O'Connell Contracts Manager : A Mabey Resident Engineer : M Elton	Chief Engineer Hampshire Highways: West Contract Clerk : S Peach Quantity Surveyor : J Laing
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 Certificate No PS 1/045

Appendix 9: Raw Project Data – Master Data collected from 164 Projects

Appendix 10: Calculations of Critical Success Factors and Project Success Index

Appendix 11: Interview transcripts



Anglia Ruskin
University



Hampshire
County Council

Framework Research
Interview Transcription
November 2011

In this transcription the term ‘frameworks’ or ‘HCC frameworks’ is defined as frameworks in the context of Improvement Works Framework 1 and Improvement Works Framework 2 of Hampshire County Council.

Reference to the term ‘traditional procurement’ is defined as the individual selection of a supplier outside of a framework.

Code name: 01 CW

Organisation: Contractor/supplier

Profession: Chartered Engineer

Gender: M

Years experience: 37

Seniority: Managing Director of company with £20M p.a. turnover

Knowledge of frameworks and traditional procurement methods: yes extensive knowledge

Q6 In your view, what are the drivers that encourage suppliers to start on time?

Um... there are two principle ones I think. Err I think the first one is to make sure that we get appropriate lead in times. The goal of the time variable often gets delayed beyond peoples expectations and invariably in contract meetings we get pushed to start sooner than is I think reasonable in some circumstances. At the end of the day we or any other contractor have a finite resource and err in the way that we are competing for separate contracts, from different suppliers, err, we have relatively short time spans in order to allocate resources. I think lead in time is therefore important, not only to get the start date right, but to be in a position where we have got all the arrangements made so that you can hit the ground running. At the end of the day if you're not properly prepared and they start a job at a certain time, it doesn't mean you're going to complete the job any sooner because you're not sort of fully prepared. So I think that's a particular issue. At the second one, is that I do think that the framework membership can influence err the team decision making on behalf of us when we might start. Err, as I've explained we are competing with different contractors, often in intense situations, for many different suppliers, and it's

not uncommon to have different suppliers in effect trying to compete for our same resources at the same time. Whilst we as an organisation find that we deal with all our clients in an even handed way, clearly being a member of a framework, that puts back to the client that they're in a better more special place as far as were concerned and therefore I think that if we're faced with difficulties with allocation of resources then we will give priority to a client where we're working in a framework with them, because that organisation is providing us with long term commitments. That is a priority in my position as a managing director of construction. So I would say they are the two main issues were faced with on start times.

Q7 In your view, what are the drivers that encourage suppliers to finish on time?

Again, two specific things come to mind here. The first one is... err... the first and most important is the financial penalty that we incur as a consequence of not finishing on time... or commonly, under the various terms of the contract err if we didn't finish on time. Then with the other contracts, the A, B, D or D options, a failure to complete on time will, err, notwithstanding obviously any properly awarded extension time, but that aside, a failure to complete on time will extend our costs and effectively that will penalise us financially. So that is by far the most important driver. I think the partnership, err the membership of the framework does have an influence and I think it's that priority influence again at the end of the day. The fact that our performance is being monitored and that monitoring of our performance contributes to our future ability, or not, to secure more work, then because of that fact, then, again, that raises the priority to make the customer that bit more important beyond the cost exercise to complete on time.

Q8 In your view, what can be done to encourage suppliers to start and finish on time?

Err, I mean in terms of, I've mentioned the business about lead in times and I think that's probably the biggest single thing. Err I mean my, my experience of the framework, and indeed my experience of the err work for Hampshire County Council before, before the framework, is that I felt that our performance in terms of starting on time and completing on time is pretty good actually and err in that respect I don't

think there's any, in my perspective I don't think certain encouragement is particularly necessary because I think we perform fairly well anyway. In fact, I think we perform very well actually. Err, whether that's the case across the piece I don't know, that's something you would know and I wouldn't so err. But again, the key thing here is appropriate lead in times. That is a key factor in getting a job started in a timely fashion and when you're starting you're properly prepared and as a contractor you have time to marshal the resources you want to marshal, to make sure that you've got the best people in the best places.

Q9 In your opinion, do you think that frameworks encourage accurate start and finish dates more than traditional procurement method? Why do you think that is?

I think if you, if you err, if you looked at, err if I considered my company, and its performance with Hampshire County Council, then I think probably, our performance prior to the framework and after the framework is probably pretty similar and I think that our best comments about being in a framework mainly is, perhaps in regards to Hampshire County Council as a more priority client. The reality is that even when we worked for Hampshire County Council before the framework Hampshire retained that priority in our minds. It's quite obvious really. We're a regional contractor, civil engineering and building contractor, and clearly a client, err a high profile client such as Hampshire County Council is a natural and extremely important client to our organisation. So I think in that way, the way that we sort of treat or perform for Hampshire County Council probably has a significance on being in the framework or not.

Q10 In your view, what are the drivers that encourage stronger and closer relationships between parties to a construction project? Why do you think that is?

I think, it's very easy to compare working in the public sector to working in the private sector and I'm going to come back to that. Err, I think the participation to the framework from all members, err, does encourage a stronger and a closer relationship because you are participating together and as a result you create more common goals and have a key working approach. And partly, that's partly dependent upon specific contracts. I think if you compare the Winchester High Street contract

where the option was a target cost contract, was chosen to share risks in a different way to other forms of contract, err and that was done because of the nature of the work. The ECI theory which is not commonly used err by Hampshire or by many of my other clients, err in that circumstance, not only in my opinion, was extremely beneficial to the end result, and engendered a commonality and a team work approach. So in that respect and I don't think had Winchester High Street been secured outside of that framework, it wouldn't have been secured in the same way. I think it's very unlikely it would have been secured in the same way, and I think as a result of that, I think that the outcome potentially would not have been as good. Now, you can also then turn to a less high profile, a less potentially problematic and lower risk contract, err, such as improving a waste disposal facility for example, a sort of fairly straight forward traditional type of contract. Now you know, I think in terms of the relationships there, where the framework improves relationships, is the relationship in part because you're familiar with working with each other? Business is being about people, and successful business is about people working together. And that's where the comparison between the private sector and the public sector is quite interesting because, and I would say as a company very roughly 50% of our work is the private sector clients and the other 50% is for public sector clients. And most of which, we have these strong relationships but naturally, by the rules of public procurement there are more barriers in the way of developing personal relationships with the public sector. And that's not a criticism, but by its nature, there are, has to be more checks and balances when you're dealing with a public organisation. When you look at private organisations, and your relationship with them, you work very well, once you've developed a relationship, you work very close and you get the best results for both parties. I could give you numerous examples of that where a good relationship with people who know each other, who will work well together, have a relationship, will work best together. And if you work best together, then its not surprising that you're going to end up with a better outcome. I think to a certain extent, and again, you know there are limitations to that, but those limitations are enforced by whoever issues and informal contract, which, as I've said is important because, it's a publicly secured product that we have to do and therefore you have to have that formality. There will always be difference between the public and private sector and quite rightly so really, I think the thing that encourages stronger relationships is working together and developing a relationship.

Q11 In your opinion, what are the drivers that encourage projects to be completed 'right first time'? Does the procurement help or hinder this?

Err, well I think the biggest single driver to get things right the very first time is to have good quality labour, subcontractors and management. That's kind of just stating the obvious really but, you do get that with continuity of people. It's just like saying you get a good relationship between ourselves as employer and contractor because we're familiar with each other. Similarly, exactly the same applies from the point of view of your own labour or subcontractors. Um, I think, I mean again I think because we're a regional based contractor and we retain a lot of our own staff, and as subcontractors we use other same subcontractors, then the continuity of work that framework helps us to retain, enables us to develop long term relationships across our supply chain which ultimately maintains, you therefore get the same people, you get the best quality, err and you get more buy in from that supply chain because they themselves recognise the importance of the client base. So I think that's one driver. I think the other driver is the company of course. I think we as a company endeavour to give all of our clients a good product, because ultimately if you give the client a good product at a good price, they're going to come again. I think I mentioned before, my number one priority is that my employees work to maintain a profitable company and I'm only going to do that if I can continue to get work opportunity. And I think the other thing is the framework participation and I think there's a question coming later about that. At the end of the day, a KPI if your future performance or ability to perform is affected by a measure of something, then naturally, if you're going to be measured on something it becomes a greater priority for you. So in that respect the participation in the framework using the KPI is an important factor in it. I think, err I mean it would be very interesting to see, there are some elements when I look across the framework, strictly in comparison to framework one and framework two, as to whether the quality varies much between the two frameworks. I mean, with framework one, we find it quite hard to complete. I mean, we've done our share of jobs, but much in the minority and not unsurprisingly I've sat the scratching my head thinking, well how on earth, why are we struggling to compete against people. And there are two elements, one of which I don't think we can change, and one of the things I think has really challenged me, and I think one of

the things is we compete against smaller organisations. So I think actually we carry a greater overhead and I think that has to have come from somewhere. So I think we might be at a bit of a disadvantage there. But what I also think when I look at framework one jobs. Even the ones we do, we don't, and I mean I think financially, they're hard to play. And I think it's the level of supervision we put into our work and, you know, we tend to make sure there's always a supervisor there to ensure that we've got the right level of quality there and I think possibly, that must make a difference between us because at the end of the day the materials all cost the same, the labour rates, well they might vary a bit but they won't be hugely different, um, so I think whether or not you bind with that, the issues in framework one or not is a really interesting question to me but in some ways I would say that participation in a framework would certainly in the round sense encourages quality.

Q12 In your opinion, which procurement method encourages longer term relationships between parties to a construction project? Why do you think this is?

Yeah, I mean a framework, in itself, is a long term relationship. I mean, a framework is four years and err when you participate in a framework that by its very nature is a long term relationship. Conversely, if you go back to traditional procurement that may or may not achieve the same relationship depending upon how traditional procurement was actually achieved. In other words, if you achieve err if a traditionally public model is worked on to select list, and the way in which contractors were given opportunity to tender varies between different authorities. Other authorities have a different selection process and they would select contractors on the basis of which contractors they thought were most appropriate to do whatever that works is. At the end of the day, there was a number of authorities which we were participants in the tender process and as a consequence we got a reasonable continuity of work and in that respect I would say ultimately that we had a long term relationship with Hampshire County Council before the framework. I think as I've said in relation to the previous question, our relationship with Hampshire County Council is a closer one now because of the framework, err, but a long relationship was there previously. Now and again the provisions of a relationship... I mean relationships are about people. It's not so much about the relationship between.. sorry.. it isn't about the relationship between Hampshire County Council and my

company as a supplier, moreover its about the relationship between err my site manager A and your resident engineer B and that's what the relationship is. Or my QS X and your QS Y, you know me as managing director of a company and one of the senior officers at Hampshire County Council. You know, that's what relationships are, it isn't just the relationship between parties.

Q13 In your view, does the use of key performance indicators help the parties gain better performance with projects? Why do you think this is?

Yes, is the answer. KPI's concentrate minds and I think that's quite a good term really because there is a measurement issue and the way in which that measure affects our future ability to secure work. And I also think err and I think the way you've set up the framework has been quite nice in that its been a carrot and stick approach. I think you know, that's the right approach. I think you achieve probably, the best outcome by that. So I think that err, you do definitely get better performance. I think there's also a hard aspect if you like. You know, if you get in the red zone then you're less likely to get work and you'll be looked upon less favourably. The reverse is also true if you're in the green zone. So those are the harder aspects of it and they work. I think there are also the softer aspects of it in that it becomes part of your day to day. So for example, we will give toolbox talks to our opted staff about these issues. Now we would have never ever done that before. We'd have given the staff a talk about our health and safety obviously or environmentalists but we wouldn't give them toolbox talks about... 'look guys, this is our first time with this client, not only is this financial but its going to affect our ability with this client'. So your driving those improvements right the way down to those guys that are doing the work. And as I've said before about quality of work and all the rest of it, the guys that actually do the work are often forgotten in the management circles. But at the end of the day those are the guys that are actually going to do the work, those are the guys that are working on the shop and influencing what members of the public think about the work that we do. So I think with the use of those KPI's, those kinds of softer elements, which we probably haven't got made very accurately, there's a kind of gain. As I say they're very raw terms but KPI's concentrate minds and I think that's important.

Q14 In your opinion, is the collection of key performance data worthwhile? Is it demanding?

Yes, it is quite demanding to do it properly. I mean not aversely but it is quite demanding, I mean its got to be meaningful hasn't it? It is worthwhile. Two things, I mean I've already explained how I believe KPI improves performance and therefore its got to be worthwhile. Err, with regards to being demanding, you know, we're participating in a framework so you cant, err you get out of life what you put in so if you expect to get more out of a framework in the roundest sense, whether that be a better product or more security, then you've got to put something into it.

Q15 In your view, does the use of a framework help with the balance of risk allocation? Why do you think it is?

Risk covers a longitude of things. I mean I think in the contractual sense of the word and that's my choice of the term under which we work.. in that respect, the framework.. the choice of which contractors you use will determine what the risk balance is. So your question, how will the framework 'help' with the balance of risk, I'm not quite sure what you're question is...

Having said that, well I think the NEC contract... well that's another thing to say about contracts. Contracts are about spirit not letter, they always were, they always will be, and at the end of the day whether that's a traditional ICE contract that we use for the framework or the NEC contract, you know their a standard forms of contract and they're fair in my view and this framework has bought in the opportunity for you to choose different options between different frameworks and I think that's a very proactive, progressive move. I think looking at that the way that that's worked, particularly with the target contract, I think that's a good example. I think that wasn't exactly how in envisioned it but never the less, I think the framework encouraged that but at the end of the day the risk was determined by the contract. But there are other risks which aren't just contractual risks. I mean from a clients perspective, every now and again a job might go pear shaped. The framework gives the client a reduced risk of jobs going pear shaped for example. Does the framework equally produce the risk of err a problem contract specifically from a contractors point of

view? He's got a good relationship, he knows what his client will expect and therefore he... well there's two things. One of them is that he reduces the risk because the client becomes a known entity, and as a consequence err I think the client benefits from a more competitive price because reduced risk usually means you get a more competitive price. So I mean risk comes in many ways and there are other risk in terms of, you know, as far as the clients concerned about umm how the public perceive the work and err and all those sorts of things so it's a huge subject in itself and its very difficult to sort of break down enough that you can balance risk allocation in a concise manner. I think that probably covers most of the main points in answer to that question.

Q16 Which methods (traditional verses framework) do you think provides the most effective communication between participants in construction projects? Why do you feel this?

I think the framework does. I look at the framework in comparison to how our relationship was previously and I think our communication has improved. I think there's no doubt about that and I've touched on that a number of times already. I think as to why... I think I'll have to do a general view because I think all individuals are different. I refer to carrots and sticks. The way that traditionally contractor and client have worked through various terms through NEC or IC, there's always been a kind of carrot and stick approach. You know, there have always been various elements of working as a team but you know at the end of the day employer has powers under the terms of a contract and he can exercise them in different ways. And I think that I look at individuals in the public sector and I'm not talking specifically about Hampshire County Council, but I look at how costs in the public sector, you know some of them, traditionally some clients have a fairly, I was going to say a derogatory view of contractors but I think that's the wrong word... guarded view I think would be better, guarded view of contractors. They kind of view them with a little bit of suspicion.. you know because of motives... you know we often have self motives and as a result of that that kind of created a barrier of opinion between contractor and client. I feel that because of the development of relationships, I think if you improve the relationships between people then those barriers start to break down and communication naturally then improves.

Q17 Which methods (traditional verses framework) do you think allows financial control of a project to be used most effectively? Why do you feel this is so?

I don't actually really know what you mean by financial control but at the end of the day the first thing is the choice of contract is a big driver in how finances are controlled. In other words, if when you mean financial control you mean what the outcome cost is compared to the budget cost then that will often be down to your budget cost. Or do you mean what's the difference between the outcome cost and the tender cost and whether that's financially controlled, because from my point of view the control of the finances within a job are controlled by whichever contract it is. You know, I mean its paid on a month evaluation, if its option A its paid on that schedule and umm if its option B then its paid on a bill of quantities. I mean I know traditionally option A contracts, the payments a little bit more relaxed about part payments on activity schedules rather than, you know payment to the actual letter. But that's common to all our clients. So that, if you like the micro financial control of a project is the same in terms of a mechanism of doing evaluations and all the rest of it. Now in terms of looking at the macro financial control, in other words how to sit against budgets, how to sit against tendered prices, umm I don't think it probably makes a great deal of difference because you know at the end of the day if you're given a job, say for example you're given a road and asked to repair a soft spot then that road is going to cost you the same whether its done traditionally or whether its done from in or out of a framework. I mean, if that question is more sort of aimed at 'claims', is what you're saying that that does the framework increase or decrease the claims consciousness of a supplier? From my own personal point of view... I don't think it makes any difference. I mean a lot of claims conscious organisations were there before and are there now. Whether that's a case of cost I don't know because obviously I'm not part of that information.

Q18 Do you feel that we should continue the use of frameworks In the future when the current ones expire in 2012?

That's what the framework format is. There are two frameworks close to my heart. Our office is on the boundary of Dorset and Hampshire. Dorset and Hampshire are

two counties which we traditionally always do highway work for. Now, Dorset County Council had a framework and they had a framework with one contractor. Because of the size of that framework and the one contractor they had to deal with, from the turnover point of view irrespective of any other issue at all then we no longer carry out any highway work for Dorset County Council. If that was the potential use of another framework then the answer to that question is very obvious... no, I don't think so. Whether that framework is indeed the best outcome for Hampshire County Council I don't know, I personally doubt it but in my opinion its not relevant to that. If the framework is similar to the one you've got then my answer is yes. You know, I've made the comment that I felt it was quite enlightened and I think I a number of aspects in that you've got a system which balances the reward for positive or negative performance on issues other than financial ones and I think that's a balance you've got quite good in the way that you've got your greens and your ambers and that's worked quite well. I think that the framework delivers good value for money to Hampshire County Council because it retains genuine competition and you know, I'm a great believer in retaining competition. I think that's one of the things that I think sounds odd coming from a contractor, we usually want as little competition as possible. But the reality is at the end of the day, that we always perform very well when we're in competition because we're a league organisation and therefore I think that competition delivers good value for money which I'm glad to say has become more on the agenda in the last couple of years because of this financial circumstance in which we find ourselves and in certain respects the issue of value for money had kind of slipped down the priorities a bit, I mean sometimes you wonder why. From our point of view to continue to use the framework... yeah.. as I've explained my responsibility is to maintain a profitable company and maintain employment for my employees and in order to do that I have to secure as many opportunities as I can. The framework does increase the opportunity for work for my company. Equally it's a two way street, we're party of your framework and we have to deliver to that framework in terms of quality and all the other aspects which we discussed.

Q19 Do you feel that the use of incentives to encourage good performance within frameworks is worthwhile? Do you have views as to what these incentives should comprise?

Ummm, I mean yes I have already answered that question and I do think use of incentives has encouraged good performance and I think it has produced good performance and obviously you've got the benefit perhaps not across all KPI's but across certain KPI's of looking at how the contractors performed during the framework and before the framework and I imagine that would obviously be concrete information its just whether or not that is the case. As to the question of which incentives to use, again, I think the KPI's you've used are a good balance. I mean the CO2 measure which hasn't got integrated into the framework as much are notoriously difficult to measure. At the end of the day if you have an in-depth performance indicator which you cant reliably or sensibly measure there's not a great deal of point in having it because it becomes meaningless. That's the important thing about these performance indicators because if you'd rather just follow the indicators without meaning then it devalues the use of all of them because people think... 'wait a second.. this is nonsense'. If you have a KPI they've got to be smart, and they have to be valid to what you do. They have to accurately map what you want. They're not some nebular thing you want to find out for interest, its.. if these forced markers are increased, is that what we want to achieve. I think you've got the right balance I have to say.

Code name: 02 DD

Organisation: Hampshire County Council

Profession: Chartered Engineer

Gender: M

Years experience: 22 years

Seniority: Group Design Engineer

Knowledge of frameworks and traditional procurement methods: yes both

Q6 In your view, what are the drivers that encourage suppliers to start on time?

Yeah, I think, my observations would be that definitely.... I definitely get more sticks and carrots when you get contractors to start on time. Especially, I do think the challenges arise in the logistics of getting contractors finishing one job and the mobilisation to get onto another job and err often that is a conflict for them. So I think the only way to get them to start as when we want is to provide some sort of sanctions that would impact upon their performance of future work. So I think we'd have to be... more sanctions... more sort of drivers and encouragements. I think, keep the encouragements, and keep the sort of bonuses.. but I think it sort of comes down to them doing what they said they would do so its more of a compliance matter with the terms of the contract. Yeah, that would probably be about it.

Q7 In your view, what are the drivers that encourage suppliers to finish on time?

I guess if you set aside the contract obligations element for the time being... I guess other than that the drivers are: reputation, I guess customer impressions of the company of it are important. So I guess they've got a reputation factor which really is probably something for them to bear in mind. Especially if they're in the public eye with performance data being published, lets say that they will stick to something. And as a social benefit its good. It's a marketing thing to be able to say "look, we finished this ahead of said schedule" etc. But when it comes down to actually finishing on time then prolongation comes into play, equity use of damages, or obviously agreed extension of time. I think that if your contracts are not well managed, to the letter of that, then most definitely contractors will see that as having a weakness and things will drift away - and that has an effect on completion. And that's nothing to do with the contractor, that's just simple human nature I suppose to try and make their life as simple as possible. Especially if contracts seem to be end to end for them with continuation, so its kind of a link to the start question its kind of the same... what encourages them to start you know also encourages them to end. Those start and end dates I think link because they are already doing jobs. One will lead on to the other one and potentially in a framework they're doing both for us. So

I think that's a second point. Projects linked by a framework will encourage suppliers to finish promptly.

Q8 In your view, what can be done to encourage suppliers to start and finish on time?

I think the management of Winchester High Street having the contractor involvement encouraged engagement and the thinking process and the planning process really.. and gave again accountability for all involved. It was encouraging them to think about the project ahead of where the bottom line when we said we needed to think about it. It actually engaged them in the process and I guess encouraged them to think about the process and I guess have it at the forefront of their mind before they got going on site. I was taking an advisory role with the contract and it was my ideal to just start talking with a couple of engineers and the project manager on that, so I guess communication is key. A strong relationship at the start is good because you cannot present halfway through your preparations within your ideas of a program. And I guess that sort of encourages all of us to be thinking ahead all the time. Incentives, such as in the framework does help focus people on consequences of that and make preparations quicker. You've given them deadlines that need meeting or just setting aside time to do a task. Setting the time with the contractor during the tender process and communicating helps them to set aside that time to think about it, and how they're going to manage it.

Q9 In your opinion, do you think that frameworks encourage accurate start and finish dates more than traditional procurement method? Why do you think that is?

I think its debatable. I think possibly its not any different. But they are coming from two totally different ends of the spectrum. I think for the traditional methods, there's a sense of a lack of accountability, you know, to perpetuate the relationship which means they might be being extremely more self focused and self servant. Whereas with a framework, there's still a need for flexibility between one contract to the next because its done in a relationship environment where there's negotiation and discussion which takes place. "We're finishing off on this, we've had an extension of time. Do you mind if we start this one a week later?" And its more an agreement than

it is a conflict. So there's a negotiation that takes place, there's a healthy collaboration on delivery without it being confrontational. But still, the start date may not materialise for either of those reasons.

Q10 In your view, what are the drivers that encourage stronger and closer relationships between parties to a construction project? Why do you think that is?

Yeah, I mean it may sound a bit fluffy but I definitely think that respect and relationship has a lot to do with that. And respect comes down to value and an appreciation of the value that each party brings to their working of a construction project. So I guess equally if a project is initiated by a client then there's a sense of value that a client can express (or in part through their communication with a contractor) which says "I appreciate your opinion, your input" in the planning stages of a project engenders respect and therefore a closer working relationship. I guess is a mindset in which to include and involve them rather than simply be focused on a monetary value. And I guess this works in the same way for this contractor as for a consultant. Working with a client is the same type of relationship that even we as designers... Um, the way that some clients are only involved in the bottom line, about how much time they're spending on a job, rather than.. 'are we getting value for that conversation that we're having or that input that we've been putting into it?'. So those can, if you set aside the financial err bottom line if you like, to respect the professionalism and then to have a default position of trust in that person's professional ability and experience enables a far more respectful relationship I think. Stronger relationships are more important rather than embracing conditions of contract... I guess there's a sense of... I mean openness definitely enables openness through long term relationships from working together on a regular basis through frameworks. You have to be seen as all knowing, or even more knowledgeable than you really are, to reach a sort of glass wall between that relationship. You know... there's a hindrance between working relationship and meaningful.

Q11 In your opinion, what are the drivers that encourage projects to be completed 'right first time'? Does the procurement help or hinder this?

I think 'right first time' is to do with quality of information. And that's communication, clarity of information that's available, clarity of information that's not available. The clarity of process, of specification, of requirements... and err that's quite key I think. But the bottom line is where you start as you mean to go on almost. Like with the drivers, they encourage projects through the quick communication and inclusive behaviour. I think that inclusive behaviour is to do with involvement. These elements might on the face of it seem unrelated. Or why would you want to have a contractor involved in this discussion? But once you perceive benefits and again you can perceive the value of the event of that conversation. That again will obviously have a respecting of any input into achieving right first time. Again the long term relationships and communication are important in this. A simple few sentences by a contractor expressing a different viewpoint can totally change the approach. So yes, communication is probably the biggest as far as I can see. I don't think there's anything else.

Q12 In your opinion, which procurement method encourages longer term relationships between parties to a construction project? Why do you think this is?

Err, I think there's a key difference between frame working and traditional. The framework has a definite encouragement towards longer term relationships just by the fact that they are a longer term contractual relationship. I think, and err clearly again the traditional ones use shorter relationships because there is no connection between each project. So err, I think the new challenge of parties actually stretches beyond that of a framework because at the end of the day you could have a relationship for the duration of your contract as well. These challenges will extend beyond the contractual relationship because they include additional elements beyond the contract such as site welfare. And I actually think, you know, it's a no brainer. You've got a four year framework of course you're going to have a longer term relationship because there is time to understand each other. You can sometimes feel like that relationship is a ball and chain rather than a benefit. So I think yeah, the framework and the length of it determines the relationship, but the challenge is an extension of the current arrangement to encourage performance. So I don't know if that's through the procurement method, I guess so because frameworks are very different from individual contracts.

But beside from procurement methods I think I tend to find, I've just always experienced that longer term relationships are better. Yeah, I suppose the procurement method is one of the key things that enables you have longer term relationships. Frameworks seem to also allow you to speak to suppliers for advice – because of the relationship. There are lots of times where we're trying to get someone to help us in doing something. And often you're hindered by 'you need to use this contract, you cannot speak to a supplier. There has to be a real relationship at least to enable you to have that conversation. And that I suppose there's a legal relationship, and that relationship was put in to place which in enables a freedom to take place of give and take and discuss issues without feeling that you've been chained into some legal contract.. "you cant do this, and you cant do this and you've got to do this and...", rather than just a simple exchange of advice and services. So yes, I suppose traditional contracts can be as annoying as they can be releasing. But it really comes down to the agreement of the terms and agreements of fixed fees. I think its that payment.. I think the agreement conditions are what drives that relationship. I guess an example of that would be us working with the Architects for example, I think the thing is that we always work traditionally under a discreet contract. And trying to estimate our time for fee levels whereas the Architects are used to dealing with other consultants if you like on a percentage fee basis of a construction. With other high estimates they need to be extended because there's been extra requests etc. Whereas this is an ethos of 'you win some you lose some' but we'll square up at the end of the financial year on set projects; then that gets contractual obligations out of the way. That's not entering into our discussions, that's not entering our heads to even have these conversations. We've agreed terms that effect us enough to not hinder our relationships... you know, of what needs to be said and what needs to be done so we don't have to define every single abbreviation in terms of our design because someone is ??. And that does affect our relationship.

Q13 In your view, does the use of key performance indicators help the parties gain better performance with projects? Why do you think this is?

I think in theory yes. And I think most definitely if they are the right ones and they target the right areas, then yes they can work. I think if they're in the context where there is delivery of contract and you give them an advantage with the competition

element then I think definitely, that's a really helpful tool. And I think from my experience and observing it, it does work. Where you've got one contractor where they're winning everything just because their rates were right in the first instance, but because they start to not be able to deliver on everything then these key performance indicators... again it brings them back in line. If they're not proactive and they're not able to respond to everything as a business (if they're a small business for example), I think you're winning so much work but if you're not able to react as a business to adapt to the regional systems and because the regional systems think entrepreneurially about services to enable.. not just to sort of just retain its delivery. And they just sort of think "well we'll still carry on doing our job" As opposed to "oh look, we're winning loads of work they just think that they can carry on winning and just allow their performance to drop off or the quality of work to drop off. I definitely think that the KPI's works well to focus their attention a bit. So that's good. I think there is other ones that can be very effective - but I think ones that are most subjective I guess in terms of satisfaction (client satisfaction and contractor satisfaction) are just completely loaded with tripwires and are just completely ineffective because no one wants to resolve a conflict via key performance indicators. I think that you resolve them face to face and then you work on the quality to reduce conflict resolutions and difficulties on a score of one to ten. So some KPI's yes, but they have to be clear to be effective.

Q14 In your opinion, is the collection of key performance data worthwhile? Is it demanding?

Yes and yes. I would say certainly its worthwhile. You need to be able to check where you've come from, where you're going to and how you get where you want to be. So its absolutely essential from that point of view. Is it demanding? I think there's a real need to endeavour for better performance without having to report on progress to hundreds of different people in hundreds of different ways. Um, I think that comes down to, are we really getting the value out of certain performance indicators? Or are there too many? And I think they are really demanding when there is too many different subtleties which actually don't really give you an outcome. You know, what is the outcome? Following that I suppose in different contexts if you track a satisfaction level with the client, does that actually improve the service? I

mean, are the key performance indicators improving the products, you know are they delivering the outcomes? Taking aside to other businesses, other service industries are more to do with the levels of happiness and satisfaction, and you know when the breakdown is subjective how can you demonstrate that is improving? So I think we can be all KPI'd out. I think we need to stick with the ones that are good and make sure we're focused on those outcomes. I think we need key performance indicators that are meaningful and are actually measuring the outcomes and objectives we want - and I think its all down to interpretation, such is life.

Q15 In your view, does the use of a framework help with the balance of risk allocation? Why do you think it is?

I guess my view is actually that it could be adverse. But I guess this does come down to the actual framework itself and its intended use. You know, what it was intended to be used for and what was the alternative? Sometimes you're actually introducing more risks using that scapegoat. Rather than going 'you know, lets get proper lifting equipment and look at this properly'.

If they a balance of risks within the context then definitely yeah, I think if you're delivering what you're supposed to then yes I think the risk that you'd be taking is managed well. Frameworks through long term relationships create commitment by avoiding all sorts of risks, you're avoiding these because you're working on these relationships and you're building long standing reputations. So frameworks definitely help balancing risk allocation.

Q16 Which method (traditional verses framework) do you think provides the most effective communication between participants in construction projects? Why do you feel this?

I mean there is a lot of scope within traditional projects. I mean ok if you have a construction project or something like that then it can be really focussed on what each party is going to get out of this and the communication can become too formal because of the ramifications and the consequences. But yeah, I would say with a framework contractor who's not only going to be working on this contract but on

other contracts, then communication can become more meaningful and helpful. And I think that enables learning between participants because it stops errors. I think it disarms reputation and sort of defensive stance because what you're saying is what is important to you. If you have any problems within your framework project you can communicate this to suppliers. Suppliers begin to understand what the pressures are so there's a loose sort of sense of enabling and coaching them into what we wanted. Rather than explaining the same things again and again, suppliers actually get the values we are after following two or three jobs. Everyone becomes familiar with the new system and communication does improve. So I think yes. The framework allows you to learn from your mistakes and enables you to acknowledge "ok, yeah, I made a mistake", which actually came up on both sides and actually we were agreeable with that. One problem is not the end of the world and we're not going to part ways on it because we've still got another 3 years to go on the framework.

Q17 Which method (traditional verses framework) do you think allows financial control of a project to be used most effectively? Why do you feel this is so?

Well definitely I think the framework with NEC because of the time bound elements to agreeing compensation events and this ongoing resolution of those and ramifications of those timescales as part of defining what those costs and agreeing as we go along. The mechanisms in the framework allow, you step out the back of the project and quickly within a week agree the final account saying ok and look away. And to my mind that's just incredibly efficient. I mean I think that's especially impressive with the framework as opposed to the traditional contracts.

Q18 Do you feel that we should continue the use of frameworks In the future when the current ones expire in 2012?

Yes, definitely. I think the problem in getting new contractors into the frameworks is difficult and restrictive and the law needs changing. I think we could do some work on the rules of the game, but I think most definitely they are the way forward.

Q19 Do you feel that the use of incentives to encourage good performance within frameworks is worthwhile? Do you have views as to what these incentives should comprise?

Yeah, definitely I think... I mean incentives... yeah. I mean, if you're talking about good relationships then absolutely you've got to have incentives. I think it improves relationships, better working, I think it stands to reason. But um in terms of in the framework I think the incentives there of good performance, benefiting their next submission in terms of appraising, and the competitions improve performances. Suppliers are rewarded with incentives from performance and they are benefiting from that. Use of incentives was proven on the High Street project where at the end of the day all participants came out extremely healthy in terms of our contractual situation.

Do you think the fact that KPI's are published and placed in the zone has any effect on people?

Yeah, I mean definitely.

Excluding the financial incentives...

Um yes, I think it does. I mean nobody wants to have a bad result displayed in public so I guess it possibly does do two things. It helps get those who aren't focused to focus, and it helps get those who are very focused to gain from that and to use that as evidence that they can work elsewhere.

Code name: 03 EC

Organisation: Hampshire County Council

Profession: Chartered Engineer

Gender: F

Years experience: 10 years

Seniority: Senior Engineer

Knowledge of frameworks and traditional procurement methods: yes

Q6 In your view, what are the drivers that encourage suppliers to start on time?

I think what I've seen from the programming side, things that we've all seen, is that getting to start on time, one of the key things for that is actually giving them advanced notice. Making sure they've got a really good leading period. The projects that I've been involved with, I've seen that if it's been a bit rush job and kind of ... 'oh crikey quick we start in two weeks time lets get a pre start meeting organised', that kind of the one which it all gets rushed and everything gets messed up. So I think good programming is the key to a good start to a good project.

Q7 In your view, what are the drivers that encourage suppliers to finish on time?

I think, err, the answer is also in relation to question 6. Good programming, so making sure that they started on time so they've had plenty of time to mobilise and organise any specialist type of contractors or suppliers which they might need for the job; and also, making sure that from a clients point of view that change is minimised throughout the job. So the documents that you're putting in your appendix, that's the full scheme, that's what's going to get.. that's what should ensure them finishing on time. If you, and the client keep changing the scheme plan as you go through, obviously there are going to be compensation events which lead to it, but there's a perception of finishing with some of it. Once you start with having multiple compensation events because there scope for it, I think that's where they will end up finishing over time because of their inability to plan their work effectively and efficiently

Q8 In your view, what can be done to encourage suppliers to start and finish on time?

I think ummm making sure that they are aware of the consequences of any over runs or late starts, and that because of these consequences is it really important that you start on time and the authorities do have reputation issues. If we've told subjects that we're starting on Tuesday and by Friday we haven't done anything it upsets people and that's a reputation issue for us. So in trying to encouraging the suppliers to be part of that, to share our agendas as far as reputation issues are concerned, which they don't have to because its not part of their commercial arrangement, but making them feel involved in the process I think that helps them with that. And then also, letting them have a little bit of encouragement if they are over running on projects, trying to get them to pull back their program and finish on time. Letting them propose changes to try and bring in a bit of innovation, to try and reduce their over runs and to try and make sure that's on time.

Q9 In your opinion, do you think that frameworks encourage accurate start and finish dates more than traditional procurement method? Why do you think that is?

I think they do, and I think one of the key reasons for that is the long term relationships that you get with your suppliers through a framework. If you can share a forward program with them, however vindictive it may be, they're aware of what work streams might be coming up, and what's there for them to bid for. And I think again, having prior knowledge of what works coming they feel a bit more bought in to your program, and your over works program. Rather than traditional procurement where we put schemes out on a single tender business. They have no forward view of what that program looks like. And they also have no forward view of what the program looks like past the finish date of their current project. If they know that we're delivering a bridge job over here and it might over run.. if it over runs it over runs, but they know there's three more bridge jobs coming up it gives them the motivation to make sure that they're finishing properly. Also that leads back to all our Hampshire frameworks and our performance mechanisms which are fantastic for encouraging that. They know that there's a penalty for over running without good cause so again that affects their competitiveness, and that's against them having a

wider view of what works in the prime time and what works they may be missing out on potentially as a consequence of their finishing date over running.

Q10 In your view, what are the drivers that encourage stronger and closer relationships between parties to a construction project? Why do you think that is?

I think good working relationships are key to successful delivery of any project, and I think that if you've got a good working relationship then it enables better communication between the parties and that communication can lead to closer relationships and enable... if you've good working communication then um, with your client or your supplier, it works both ways and I think than it can probably be.... If one party can go to the other and go 'look, we've got a problem' as early as it is, you can try and work through that problem together which again builds your relationship. If you're in a more managerial position and there's potentially an element of thinking either err... if we go to them their going to be looking at a commercial element where money can be made or saved from this or they may be using an attitude which I've seen on site where party one talk to each other because they have an managerial relationship between them and they feel like they're going to loose face by admitting that one of them has, well, made a mistake or there's a problem within the supply chain, umm but I think that can actually damage the project. So actually having really good communication with each other on projects and be able to be open about issues that are arising as soon as they arise, helps build stronger project teams across different parts of delivery.

Q11 In your opinion, what are the drivers that encourage projects to be completed 'right first time'? Does the procurement help or hinder this?

Umm again, communication needs to be a key player in delivering a project which is right first time. Any time the supplier needs to know exactly what he is delivering, can he deliver it in the correct way and on time? And being able to ask questions to the client and the design team, um, where there's been ambiguity can lead to ironing those things out to deliver the project. Rather than delivering the project when you're not sure about the signage and so you put what you think might be right even then you don't think you've done a good job because there ambiguity in the drawing. Err,

and I think procurement can help that, err again through being open, your form of contract can help to ensure that projects are right first time. Again, NEC through the partnering ethos and very much through ethos of having open communication, early notification of issues, as opposed to say an ICE service where you could have had a... 'this is ambiguous.. we'll put it in the cheapest way because that's the way we're going to make money out of it and the client clarifies this and we might make a bit of money and that's fine. But the project won't be right first time.

Q12 In your opinion, which procurement method encourages longer term relationships between parties to a construction project? Why do you think this is?

Ummm, I think frameworks definitely do encourage long term relationships between parties because of that ability to build relationships between organisations through a series of projects at multiple times. I think also the framework has the added benefit that your suppliers will talk to each other in an as open way as they'll ever talk to each other, and that will help the strength of your team behind it. I've seen situations where one supplier has issues with certain elements of the client's staff and other don't. I think its quite a good yardstick for the organisation to be able to say.. "Ok, these two people don't seem to be getting on. Why is that? Is it a resolvable issue or is it a personality problem?" And I think this is kind of the same with your framework. You can kind of look at the performance mechanisms involved, you can look at the KPI scores, the client satisfaction scores, and you can see where there might be relationship issues. You can say.. "well maybe we're not performing as well as an organisation because these people seem quite disgruntled about these aspects of our work", which has to be a positive thing to draw out of it. You know, saying "Ok, what can we do better". And again, same for suppliers, you know, can you get them to pull there socks up and perform in a better way than they would have done on a traditional project? Because again, traditional projects, it's a single procurement, you may or may not work for them again. It's that long term relationship that you can build. Especially when you can use things like framework forum meetings – strategy boards, getting everyone in a room together and talking through issues in a generic way really - If anyone feels threatened about their commercial sensitivity, and I think that's a positive thing.

Q13 In your view, does the use of key performance indicators help the parties gain better performance with projects? Why do you think this is?

I do think at there's better performance. I mean again, you're monitoring their continual performance and trying to get them to up there game every time and maintain a really high standard, and they know there is commercial benefit in that for them. I think it also helps us to be able to benchmark ourselves as an authority with the wider authorities in the area and across the country which is fantastic because I mean you can show best performance and transfer that across. And again it also helps when we are having issues. If our design teams seems to be continually making the same mistakes, for example IPS scheme if you see the same niggles which keep coming out, it flags to us as an authority that we have got a problem and that if we iron that out we can save time and money and improve delivery in the future and get a better product at the end of it.

Q14 In your opinion, is the collection of key performance data worthwhile? Is it demanding?

I think, I think it's worthwhile. It's what data you collect and what you do with it which makes it worthwhile. Err, I've been looking at KPI recently, sort of arranging KPI use so it can go in a new contract and some of it, you kind of look at it and think "oh we need that piece of data collecting because that's really important to us politically" its err, you know, its something that's a political driver for us. And you turn around and say "well, what's the actual range for the performance"... when you know its kind of a case of "this piece of service is for sale, and its one percent of the service overall delivered and you think "well why am I bothering to measure that". Yes, I know its politically makes sense for me, but I'm not going to collect that piece of KPI data when its reporting a different way of work and not when its actually the contractual obligation of the supplier. I think they can be seen as being really onerous and demanding and if they are not used in the correct way then they can become very onerous and demanding. If you've got initially 30 KPI which you have to report on (because they're all the ones that the client wants to see) but actually only ten of them are going to effect your contractual arrangement or your pay at the end of the day... you know are the value of the other 20 really important? I also think that if

you have too many KPI's people do think.. I mean we always say "oh I've got to put the KPI scores in" and you've got a collection growing around you and you say "oh that time we're being better or worse against our KPI". But, once people start doing it they realise that its not onerous if you've got a good, snappy, sharp system which allows you to put it in within a couple of minutes and we don't mind doing it. The more people do it, the more they think.. "I'll just drop it in, I've got two minutes at the end of the day, and I'll pop them in". And again I think any KPI collected has to be really focused and everybody has to see the advantage of it. Because if people don't see the value of entering those KPI's they will not do it. And we can turn round until we're blue in the face and say "Do your KPI's" And again, its kind of the measurement of risk... you have to have a small incentive to make it worthwhile collecting. I mean, if only three people out of 100 are doing it then it kind of makes a mockery of the system.

Q15 n your view, does the use of a framework help with the balance of risk allocation? Why do you think it is?

Umm, I think it might do. I've not had a whole lot of experience doing risk allocations with the restriction of contracts. I think again it kind of comes back to saying okay, having open communication and being able to, when you are doing risk allocations, to be able to say.. "ok whose the most eligible to take the risk", and being able to have that open and frank discussion, which maybe promoted through the fact that it's a framework will help with that. I think other than that though, it depends on what type of contract you're using with the framework. So it comes down to actually administering the contract correctly. So if you're using the framework and you're doing multiple jobs which are based on the same contract, you should be getting very good at doing balance of risk allocation. So I think the framework itself probably doesn't promote it on its own, but it helps provide the right tool kit with the open communication, the familiarity of the user's contract which will help balance risk allocation

Q16 Which method (traditional verses framework) do you think provides the most effective communication between participants in construction projects? Why do you feel this?

Err I think, again it goes slightly back to conditions of contract. So if you've got a framework which is built around using NEC3 forms of contract, then that is about having good communication, a good ethos of partnering. If you've got good partnering and you're really entering the spirit of the contract then you should have effective communication. I think if you were to give a traditional stand alone contract on its own but it was still NEC3, you should still have good lines of communication, um but I don't think it would be as effective as if you were given that contract under a framework agreement because you've got these long standing relationships have been built up and you've got this umm again, kind of overall view of the organisation in which you're working.

So are you saying that... lets see if I can sort of repeat really, are you saying that the formal contract is important but you think something can be added by the frameworks on top of the formal contract?

Yeah, yeah I think you get that external relationship with the framework that, you know.. you're all sitting in a room together, you've got that time between you. I mean, when you start a framework, actually the process of having been through the tendering process to get on to the framework and moving close to the framework, actually gives you the relationship to start delivering from day one of the framework. So you could argue, you know you were doing a traditional contract vs. a first contract or any other framework, the framework can be more effective because you've already had time together as supplier and client and you've had time together through the tendering process which is slightly more complex for a framework than it would be for a traditional project.

Do you think that can also be a disbenefit too? I mean, do you think you can get too friendly too?

Ummm, I mean I think sometimes you can run into that trap. I think that if there's a difficult conversation to be had between members of teams then it can be more awkward because you don't want to sour that relationship going forward. I think um, with a framework we also need to be wary as an organisation of how our staff are

behaving because again we need to have that continued relationship sort of thing and if we are upsetting one or more of the other ones organisation then we need to be more proactive with that whole framework than we might potentially be with traditional methods of contract.

Q17 Which method (traditional verses framework) do you think allows financial control of a project to be used most effectively? Why do you feel this is so?

Ummm, I think financial control on the project again goes slightly back to making sure that you're administering you're contract correctly... having a framework should enable you to again be more familiar with those forms of contract and know that okay... we're using NEC3 so the whole of that framework has this familiarity which means you should be in control of your systems for notifying changes in variation which should make financial control better. Also, if we're talking about forms of contract, you know NEC3 is much more proactive about financial control, or that items should be settled as we go along whereas IC six and seven jobs which have approval after we've finished but 18 months after we've finished and we still aren't anywhere near agreeing the final bill, which absolutely makes a mockery of financial control. I think the flip side of that is that if you were in a framework arrangement and you had a project which hasn't had the finances agreed and you were 18 months past completion, then that would have serious implications for your ability to deliver on a framework because it would have probably serious implications for your reputation on that framework. So I think actually the structure of a framework gives you that element of being able say... "time to financial control because that scheme should be more self contained" and actually your working relationships with people mean that yes you might have finished this project here and we might be a month or two before settling the final accounts, but it might be that you're actually working with a similar project team on the next project. So the proximity of those people should make it easier to finish up the other pieces of work. Whereas we all know its very easy on a traditional form of contract... the actual site work finishes, you dismantle the offices, you all go back to where you came from whether that's you based in Winchester and the client based out in Newbury or Bristol, and then actually having meetings to agree payment and trying to settle accounts becomes a lot more difficult. So the framework provides those

mechanisms.. err.. there's opportunities to be able to tidy up work more. So I think that financial control itself does very much go back to the offices being responsible and being quite proactive and administering the contract correctly.

Q18 Do you feel that we should continue the use of frameworks In the future when the current ones expire in 2012?

Yes, I do think we should do that and I think we should continue to develop them forward and to use the lessons that we've learned in our current framework arrangement. And that means all of them. Not just when we're looking at our securing highway frameworks or our IWF ones, we should be looking at the lessons we're learning in our professional services frameworks and then also our construction frameworks and try and incorporate good changes of good practice within our new frameworks.

Q19 Do you feel that the use of incentives to encourage good performance within frameworks is worthwhile? Do you have views as to what these incentives should comprise?

I do think that the incentives encourage good performance. Err, our traffic light system that we have currently is very effective. It seems to be the case that all the suppliers are very happy when they're in the green and as soon as soon as they drop to anything else they get very incensed about it. I think again, that incentive helps us to encourage that high level of performance. I know the school of thought is that... 'well they're all green so there's no actual advantage for them' because they're all green, but actually there is a social side of it. They're mostly always in the green, but if one of them drops to amber they all know about it and there's a little bit of a loss of face for them. So there's a sort of peer pressure in a way to help them keep performing. There's a reputation aspect where nobody wants to see themselves.... Nobody wants to be in red, but amber is almost becoming the new red "Oh, were usually in green, we cant drop to amber". And that's a really positive thing because it does mean that they are concerned about their service and they are actively engaged in maintaining it. That means that they're actively engaged with the framework, and with providing a good framework for the authority. Err and you know, there's that

awkward conversation that you have to have with the supplier when you tell them that “actually, you’re in the red zone because you didn’t do this”, and they are covered in shame and you know... “oh we’ve let ourselves down, we’ve let you down, and we’ve let everybody down. Its not good, we will do better”, which is really positive to see, yes there are reasons it happens, but its always good to see too that they’re keen on clawing it back and redeeming themselves. I think the incentives themselves, probably the financial element, the traffic light system where they have the commercial advantage is a really good one, and it’s a really clear one to implement. I think there are other incentives that we could look into err, and I know it’s a case of thinking ‘do we give them... ok we’ve got a commercial advantage for what we’re doing now, but is it a case of saying you know, could we do some different schemes with them’? Instead of just having a commercial advantage, maybe they get access to different types of work, which I know has been available through other contracts we have, but we don’t... I think actually to implement it almost a little bit of carrot but its never going to be used. I think we almost know that. And I think that some of the incentives that we have maybe should perhaps not be totally commercially based. I’m not sure how we would quite reappraise them, I mean obviously they’re ensuring good value, I mean obviously these are commercial organisations, but its not always the bottom line for them those things. There are other reputation drivers that they have so... It might be bad publicity, it might be.. you know. I’m not quite sure how we’d do that.

Do you feel that the reputation incentives... are these powerful do you know?

I think it can be. It depends on their traditional market, and I think it depends on the market as well. If they are bidding for other works, and they’re keen to look to us for a reference, that can be a really powerful thing for them. To ensure that they know works are coming up in say Wiltshire and Dorset and obviously they’re going to be launching a framework, they know that... ‘ok, we’ll keep our performance levels good. That helps us when they ask us for a reference”. Obviously that reaps up commercial gain for them at the end of the day. But I think construction workers are concerned with their reputation standing. The fact that they want to be seen delivering good products in the community and being a good, considerate constructor

or consultant. That's very much a key issue for them. You know, looking for other work, building networks and building relationships with people.

Code name: 04 JA

Organisation: Hampshire County Council

Profession: Chartered Engineer

Gender: M

Years experience: 32 years

Seniority: Senior Engineer

Knowledge of frameworks and traditional procurement methods: yes both

Q6 In your view, what are the drivers that encourage suppliers to start on time?

The system which we have introduced, and using our KPI index by explaining to them at a pre contract meeting all helps. Its always important that we explain everything at the pre contract meeting and also to give them an tentative start date, but prior to that we also normally ask them for a realistic start date so if there's a problem, holidays, interruptions etc.. so you know, we give them an idea... for all parties to agree a realistic start date and then that helps to keep the performance index up to date. Once agreed the framework KPI's help encourage suppliers to start on time.

Q7 In your view, what are the drivers that encourage suppliers to finish on time?

We normally keep them informed of the client's requirement and err, for example if you take a small job like a traffic signal scheme, the issuing contractor would be the main point alongside specialist contractors like err Siemens. So quite a few people

are involved and if the main contractor slows down then that has a knock on effect to others. So we tell them the program.... the specialists program and that helps them to produce things on time. Otherwise we'll get the suppliers penalised by using liquidated damages and the use of the KPI's. So by giving them the key dates and are asking the suppliers to done a daily program now. So... this person will come and do that, and this person will organise that, and... giving them who does what on a daily basis, that helps to get these things done on time. Explaining the importance of these issues helps encourage suppliers.

Q8 In your view, what can be done to encourage suppliers to start and finish on time?

Again, we will do the full discussion about this and then we usually give them our involvement with the public because contractors don't normally, err they have no other involvement. We control the contract because the local counsellors require it, the public require it, we do the main drop and we keep people informed. Suppliers are part of that chain and we detail to them these important things we should meet because of the required dates and by sharing our problems with them and our restrictions with them, they also get more involved and then this gives them some sort of encouragement to become involved in our process. So that helps. Just keeping them informed. And we do that again and again through contract meetings and discussions. There are so many people involved, for example we have got this works notice system, and the area of people involved, so once we have given them a date then we have to go by the date, otherwise there is the added stress. By highlighting a problem, and by keeping people informed we can encourage them to deliver.. or to start and finish on time. And if there is any delay anticipated, you can get different people to finish it.

Q9 In your opinion, do you think that frameworks encourage accurate start and finish dates more than traditional procurement method? Why do you think that is?

Err I think in our documentation we actually state and anticipated start date. So that governs them, to at least commit to that date and err if there's a problem with that date and its highlighted it will come to us saying you know... 'there's another project

starting is the first problem' and everything. So in the current framework system we have got better documentation and control over the start date.

Q10 In your view, what are the drivers that encourage stronger and closer relationships between parties to a construction project? Why do you think that is?

Again, these things we've been talking about, they are all related and um things I would mention here is regular meetings and keeping them informed. A lot of our problems come up when they're left in the dark. So by keeping them informed and provide everything they have to know we get some mutual respect between parties because there is a team work. We trust them, we let them carry on with the work and we don't interfere and we have mutual respect. And then when we delegate, we make sure that we delegate on top by keeping an eye on what's going on and just leaving them alone to get on with the work. So its um a two way process I think. Not just them and us. Sharing definitions by keeping them informed brings them closer. Regular communication is the answer.

Q11 In your opinion, what are the drivers that encourage projects to be completed 'right first time'? Does the procurement help or hinder this?

If we want to achieve right first time, we must have accurate information, accurate drawings, unambiguous information, and um at a pre contract meeting we should discuss about any special circumstances, if they have any special needs like expensive traffic management, sensitive restrictions and recycling for the environment. For example we did do a job in Winchester City where it was close to a church and we had to respect the church service time and the market space times. We had a lot of constraints. So if you can highlight all of this, in the information we give, in our documentation... we have an information sheet where we can describe all this and the contractor is aware of practical problems so he will allow for those times and constraints and he will come up with an alternative working time. So, to get it right first time, you must have accurate documentation, like drawings and things, and all the schedules should be accurate and also we should highlight all the other constraints and then if we've done all these things there won't be any unforeseen delays. As long as we are aware and work together. Sometimes you do Sunday

works, evening works to avoid problems. The frameworks allow KPI's to be measured for right first time and therefore this procurement method does help.

Q12 In your opinion, which procurement method encourages longer term relationships between parties to a construction project? Why do you think this is?

I think the framework... I suppose is the one which gives the long term relationships. Because from my experience traditional ones... they always have problems. Once the project is complete there's always an argument because of unresolved matters. I think the framework has better control in documentation, and also in delivering projects within a reasonable time. So since we started using frameworks, I don't think we have any major disputes so that shows that the framework has an advantage over other procurements. So that means we have, you know a good relationship. Once you've started using these contractors and we have mutual respect, we trust each other and that working relationship is continuing without disputes and that's continuing. We build long term relationships with suppliers.

Q13 In your view, does the use of key performance indicators help the parties gain better performance with projects? Why do you think this is?

Yes, it does. These indicators, ones they have processed the outcome as green, amber, red, no body likes to see there company as red against them. To avoid being in that area the contractor has to pull his weight and um by starting on the date he said he was going to start and attempting to perform as to the agreed program, I think he will definitely help them with that key performance index. Its like a gold star isn't it really? And that's how the performance index works, to keep them in green, they want to keep there because that will reflect. If they are aware that they are slack then that is going to reflect in their performance index. That's something that as an incentive is like a gold star.

Q14 In your opinion, is the collection of key performance data worthwhile? Is it demanding?

Yes, I think it is worthwhile. Its not too much to mark these indicators and its all done electronically now. So its not too much, its not demanding. I don't think that for... at the end of the day, if you get better results for everybody then I don't think its very demanding its just a bit of cooperation to get an idea of how we are. So I think it's a very worthwhile exercise and it's another way to improve on performance. For example, we do monthly statements and other documentation so like that this is another piece of information. I don't think it's demanding, I think its very useful.

Q15 In your view, does the use of a framework help with the balance of risk allocation? Why do you think it is?

I'm not sure that frameworks change risks and I'm not too sure about whether the framework will balance risk allocation. A risk is a risk. The framework may highlight risks and discussions with suppliers will help manage risks. Clearer documentation explaining the site conditions and other constraints help a contractor to be able to foresee a risk. The traditional way will slightly differ this approach, but in the framework you explain everything in the documentation.

Q16 Which method (traditional verses framework) do you think provides the most effective communication between participants in construction projects? Why do you feel this?

I think the current framework works better in terms of communication because it is straight forward and there is direct communication with the contractor from the start. That's it intent now isn't it with the tendering system? We document everything, everything is explained from the start and everyone knows what is required of them. So I think for communication, the framework one is much better than any other we are procuring because we have direct contact and more regular contact than we had before. If you get... you never get in practice we never get everything finished without change. If every change we get to agree what needs to be done then everything can be resolved. As I say... the other leaves a dispute in the end. So effective communication is what you see under the current framework.

Q17 Which method (traditional verses framework) do you think allows financial control of a project to be used most effectively? Why do you feel this is so?

This is a very interesting question actually, and there's a clear answer actually and the answer is that frameworks give much better control. I think that it's much better because our rates are fixed so there is good financial control, projects are agreed, there are fixed quantities as measured on site and the rates are agreed. Before the frameworks, there was less communication and a lot of disagreement at the end of a job. Whereas here with the framework system, the price is fixed so there is better financial control.

Q18 Do you feel that we should continue the use of frameworks In the future when the current ones expire in 2012?

Yes, we should. Also I ask that we should update the current documentation every year. You know, improvements, bigger quantities, and multiple items which one or two might get overlooked so there's a certain amount of work to be done here and also standard details should go hand in hand. So I would like to see a big improvement. Also, is the project five years?

No, its four years, it finishes in 2012.

Yes, definitely. And I think, if you look around, framework one is faster and neater and quicker and tidier. So all those things attribute to a really effective gain in performance. Quite a lot of these schemes are faster and we are using tendering processes that are issued electronically, so a smaller number of suppliers helps and I think we are quicker and neater. There's no trouble transferring documentation to other places or new people, its all intact now. Huge success story!

Q19 Do you feel that the use of incentives to encourage good performance within frameworks is worthwhile? Do you have views as to what these incentives should comprise?

I need you're help to expand a little bit the meaning of incentive.

Well at the moment we have as you mentioned the 'red, yellow, green' and that is an incentive obviously for someone to move into a particular zone. And we also have the performance adjustment factor which is plus or minus 5%, so that's two incentives we have at the moment. Do you think those are worthwhile?

Yes. Certainly I think they will help.

Code name: 05 JL

Organisation: Hampshire County Council

Profession: Quantity Surveyor

Gender: M

Years experience: 28 years

Seniority: Senior Surveyor

Knowledge of frameworks and traditional procurement methods: yes both

Q6 In your view, what are the drivers that encourage suppliers to start on time?

I definitely think the KPI's have had a big influence on the way contractors view the start of things. I think that when they know they are being marked, and when they know that that mark might effect there future workload, they are quite keen to stick with what has been agreed. I think the only thing I can say that is a problem is when the third parties are involved. Umm, stats diversions, lead in times, special materials. Umm, so I think the KPI's have had, you know, a big influence on how contractors view their obligations.

Q7 In your view, what are the drivers that encourage suppliers to finish on time?

Well again I think the KPI have influenced it quite a lot. You know, the contractors seem to have one eye on those all the time now and they have influenced it a lot. Perhaps they prefer it rather than applying hard sanctions like liquidated damages which is obviously a financial one. I also think then, certainly within frameworks, with the kudos and continuing working relationship with Hampshire County Council they realise that we are a pay master if you like and they like to keep on our side.

Q8 In your view, what can be done to encourage suppliers to start and finish on time?

I think at Hampshire County Council they have got to have realistic lead in and contract periods. Umm again, one that we'd all like is minimal changes in the contract (that's always good) but the other one is continual communication between all the parties. I mean, that's essential. And that's essential through all of it really

Q9 In your opinion, do you think that frameworks encourage accurate start and finish dates more than traditional procurement method? Why do you think that is?

Umm, I do. I think that fact that the KPI system is inherent within the frameworks (whereas they're not in our stand alone contracts), means that the contractors are always looking to improve their delivery. You know, if he knows he is going to be marked down, he's always happy to make that extra effort. And that err will effect his attitude towards starting, finishing, and you know, sort of lots of things in between. You don't necessarily get that on stand alone contracts err because, you know, there's no real reason. I know you've got the threat a bit about your damages, but there's no real reason for a stand alone contract (or one contract only) to make any kind of special effort. Within the framework, and within the framework for contractors, they learn that way of thinking. You know, they're trying to build relationships, they're trying to secure future work and I think its all down to the KPI's really. I mean, there is the other side of the coin I suppose in the fact that when he's in the framework he knows that whatever happens he's in the hat for the next scheme anyway. And there isn't any, there's no sort of... with the exception of marking them down on the KPI (which you can do) there's no sort of kicking them

off the wall you know, mid way through if they're really not performing. So it's a little bit mixed there. I would say that definitely there are more pros than cons on that one.

Q10 In your view, what are the drivers that encourage stronger and closer relationships between parties to a construction project? Why do you think that is?

Umm, I think one of the drivers recently has been the NEC and the fact that it's the NEC contract which encourages sort of communication, honesty, fairness, and respect amongst both the parties. If you've got those things, the relationships, you know, can only get stronger. If you respect the people that you're working with whichever side of the fence they're working on err then you know, its got to be a good thing. I think communication is the key in all of it to be honest.

Q11 In your opinion, what are the drivers that encourage projects to be completed 'right first time'? Does the procurement help or hinder this?

Again, the 'right first time' is a KPI indicator that helps to make sure jobs are finished without defects. The fact that within these frameworks the contractor knows he's going to be marked on this means that perhaps he's thinking about it a little bit more clearly than he would otherwise. So I think again when you have a stand alone contract they haven't got that hanging over them if you like. So all the time they've got one eye on the KPI indicators so they know what they are being marked on from day one, and they know what their targets are. So yeah, the right first time, again within the framework the system is in place to make sure they do. When compared with stand alone contractors, I think frameworks can be more demanding.

Q12 In your opinion, which procurement method encourages longer term relationships between parties to a construction project? Why do you think this is?

I would say in most cases it's got be the framework. Err, you know, the fact that we know we're going to be working with the same group of contractors for a period, it brings familiarity. You get to know personalities, the contractor gets to know our method of working, and he gets to know how we record things and how we think

about things. He knows how we administer and conversely we do the same the other way as well. All of that improves an understanding and I think that obviously um helps the relationships in some cases. Obviously not all the time. We obviously know that there are a lot of people out there that it doesn't matter what you do, you're still going to be in the same boat at the end of it but generally I would say that the framework is better for building relationships. Obviously the flip side of the coin for the contractor is they're looking at secured future work. And that's what they're after. You know, guaranteed workload over the next sort of three or four years.

Do you think you can become too familiar? Do you think that's a risk?

Personally, no. I think we're professional people. You know, you can like people but you also know that you've got a job to do. So you know, whilst I like some contractors, it doesn't mean that when there is an argument that's got any bearing on it at all.

Q13 In your view, does the use of key performance indicators help the parties gain better performance with projects? Why do you think this is?

Umm, I think in time, once the contractors know the parameters, umm they're keen to score as high as possible to enhance both their individual and their corporate reputations. Umm, I mean following along client lists, there are obvious financial benefits in the fact that there will be more work because of it.

Q14 In your opinion, is the collection of key performance data worthwhile? Is it demanding?

Right, well the answer is yes I do, but no I'm not involved in collecting it. So yes, I do think it's a worthwhile exercise. I think, you know, you do notice that contractors are a little bit keener to please because they know that they may be marked down if they don't perform. And its not just performing you know, in the field, its performing across the whole spectrum. So yes, I do think that its worthwhile.

Q15 In your view, does the use of a framework help with the balance of risk allocation? Why do you think it is?

Ummm, I wasn't sure about this question. I'll be honest with you. A risk is detailed in the NEC commissions of contract, umm and I'm not sure whether the method of procurement kind of changes that. I couldn't think of a reason why it should.

So you feel that irrespective of frameworks or traditional methods, its more to do with the conditions of the contract?

Its just spread risk. Yes, yeah.

Do you feel that risk is understood any differently between framework suppliers and one off suppliers?

Yeah, I mean it's the same thing really. I couldn't think of any examples where risk would have been spread any differently had it been in a framework or in a traditional contract.

Q16 Which method (traditional verses framework) do you think provides the most effective communication between participants in construction projects? Why do you feel this?

Again, I would say that the framework, or the communication between the parties is probably better within the framework environment. Again, familiarity, continued working relationships you're dealing with. You know the communication paths, you know who you've got to talk to, to get things done err and also, probably the biggest communication you know in our game is the contract. Everybody is familiar with it. It might be some specific scheme, but generally contractors know how we put our documents together. Err, and also conversely we tend to know the people on site, we tend to know their methods of working and the way that they do things. So I'd definitely say that the framework again has more pros than cons to be honest in terms of communication. You're not starting again on every contract. Especially with the smaller contractors that we deal with because we all know who does what.

Q17 Which method (traditional verses framework) do you think allows financial control of a project to be used most effectively? Why do you feel this is so?

Again, we're going back to the KPI's here in the fact that the financial KPI's and also the NEC contract, encourage rapid agreement of issues and this should ultimately should lead to financial certainty. So the fact that with the NEC and the KPI's we're looking at getting things done in a short time scale really (so we're not all waiting until the end), so you've got more control about the final outcome as things are progressing.

Q18 Do you feel that we should continue the use of frameworks In the future when the current ones expire in 2012?

Yes I do. I think perhaps we should explore the avenues of replacing contractors who continually refuse to submit or refuse to perform well. Because otherwise we're left with a reduced framework, which isn't what its all about. So yeah, I definitely think they're a good thing. Some of the people we've got on our framework in particular are not interested in doing it. And I think we need an option to kick them off if they want a job in a year or something. Or you know, that's a bit extreme, but something. I think we need to get our claws in so you know we're not reducing ourselves

Q19 Do you feel that the use of incentives to encourage good performance within frameworks is worthwhile? Do you have views as to what these incentives should comprise?

Yes, I think they are worthwhile. I mean the incentive generally is the fact that it would put the contractor in a more favourable position for further work. That's the biggest incentive going for them. There's nothing better than a continuing workload. I would like to see (I don't know whether this could work), some kind of financial or commercial resolution indicator. You know, something to do with accuracy of initial quotations, whether they are realistic and whether they end up in that position. Because you know, we do tend to get a lot of people come in and sometimes they're not doing that aspect properly. You know, not necessarily subjective, just pure

factual. For example if someone says a compensation event is going to be £2000 and it ends up at £300 because it happens. I mean, we need to perhaps to have a little think about that.

Code name: 06 KP

Organisation: Independent consultant

Profession: Highways Engineer

Gender: M

Years experience: 32 years

Seniority: Senior site engineer

Knowledge of frameworks and traditional procurement methods:

Q6 In your view, what are the drivers that encourage suppliers to start on time?

Effectively it a sort of carrot and stick approach you get. I suppose the framework allows us to penalise the contractor on any future work if they fail to start on time.

Q7 In your view, what are the drivers that encourage suppliers to finish on time?

Well it exactly the same isn't it? Its penalising them for future contracts. You can't do much about the actual project that's err suffering but you can decide through the framework whether or not, you know you've got the right contractor.

Q8 In your view, what can be done to encourage suppliers to start and finish on time?

What other than the relationships and the understanding that it important to us to start on time? Yes, I think we can do things. Well, through the framework we only use contractors who we know have a realistic view on projects and who know its important to us to start on time and have tendered the work on that basis. They might not necessarily know the exact start date we may give an indication but as a client we tend to move the goalposts quite a bit anyway. So its better to have a contractor that understands us and therefore we may be more flexible on other schemes. Other elements are important to us and the suppliers begin to understand this through long term relationships. You won't necessarily penalise the contractor if you've got a mutual agreement or whatever if they don't start on the prescribed date.

Q9 In your opinion, do you think that frameworks encourage accurate start and finish dates more than traditional procurement method? Why do you think that is?

Yeah, they can do

Why do you think that is?

Well, flexibility with the old procurement method is not necessarily selecting contractors who are performing. If you look back through traditional contractors that we use, I don't think we put much weight against their performance, we were very much geared towards price and did not take past performance into account – on some schemes that caused problems. I think the framework is now geared towards that, and the contractors are aware and very focused on their performance indicators. The suppliers are very keen to get the right scores.

Q10 In your view, what are the drivers that encourage stronger and closer relationships between parties to a construction project? Why do you think that is?

Its not really a framework issue really. I don't think the framework has made any difference at all to that relationship. But I think it's a partnering approach is what's important. Err both parties recognising each others drivers and needs and being fair and reasonable. These are the only thing that contractors seem to exclude these days and I think important decisions from them need to be based on fair and reasonable.

So you think it's not so much contractual but more of a relationship issue?

Yeah. But obviously it is under a contractual basis and I don't want to loose focus on that. But, you know, there's no reason why you can partner and work round the framework of the NEC contract but you know, not in a managerial way, but in a partnering way that works for both parties.

Q11 In your opinion, what are the drivers that encourage projects to be completed 'right first time'? Does the procurement help or hinder this?

Measuring helps but maybe not very strongly for right first time. I think all contractors would like to get it right first time, I mean it costs them money if they don't. I don't think the framework necessarily puts a huge amount of weight on that really other than that their score exists around the 'right first time'. I think there is a few contractors whom particularly wouldn't want to not get it right first time in the current economic climate so I don't think we're necessarily changing things much.

So you think its sort of a commercial pressure more than anything?

Yes. Contractors will make more money by doing things right first time. They don't get paid to re-visit the site.

Q12 In your opinion, which procurement method encourages longer term relationships between parties to a construction project? Why do you think this is?

The obvious answer is that with the framework we can tie ourselves down to a few contractors, but we had some very good long term relationships when we were using traditional procurement methods. So other than narrowing down a few of the contractors you actually select which would lead directly onto those long term relationships (I mean with the ones we're not using a lot), I don't think it necessarily encourages the sort of long term relationships we're talking about, I think in some ways the framework has hired a lot of contractors who are a lot higher on our

framework that perhaps they should be – maybe we don't necessarily want long term relationships with.

Q13 In your view, does the use of key performance indicators help the parties gain better performance with projects? Why do you think this is?

Yes. I would agree with that because it totally focuses attention on that thing which was perhaps maybe not seen as a priority during the construction process. Our thoughts can be considered and reviewed you know at all stages, periodically through the contract. So I think it does focus the attention on some things which were not necessarily err high up on the priority list.

Q14 In your opinion, is the collection of key performance data worthwhile? Is it demanding?

It's certainly not demanding, I don't reckon so. It's a management requirement through the frameworks and that after a while it becomes automatic. Its very worthwhile. I think maybe we need to focus on reviewing the data that is collected, check that everyone is applying the same criteria when scoring, and comparison between suppliers is accurate. I think we need to be aware that not to just look at the scores that are coming in but understanding the reasons behind them. Accurate definitions are essential because one person's opinion may differ from another - someone else might have a completely contrary view. We need to get together and we need to put those scores together until we can get more sense of the views in particular areas of performance

Q15 In your view, does the use of a framework help with the balance of risk allocation? Why do you think it is?

No, I don't think so. I mean the risk allocation is really set out in each contract rather than the framework contract or the NEC effectively. I don't think the framework has any place in that in my opinion.

Q16 Which method (traditional verses framework) do you think provides the most effective communication between participants in construction projects? Why do you feel this?

Umm, I mean the manner in which I've used contracts, before frameworks and since - I don't think has changed as a result of the different procurement. I don't think I see that communication in contracts any differently now than I did before the framework was put in place.

Q17 Which method (traditional verses framework) do you think allows financial control of a project to be used most effectively? Why do you feel this is so?

I would say you've been modelling that framework... since we brought the framework in we've switched from traditional to NEC. So its very easy to say the framework is improving things. The NEC is improving the manner in which we have financial control as it requires us to settle up existing issues within a time frame whereas the traditional didn't. So I don't think the framework has changed that. We definitely improved, but as a result of NEC, not the framework.

Q18 Do you feel that we should continue the use of frameworks In the future when the current ones expire in 2012?

Broadly yes. I think we're going to take that route anyway. My reservation around the framework is narrowing down the contractors that we have, and the inability to draw in new contractors and the difficulty in removing contractors from the framework. We've lost a lot of contractors who used to do us a very good job and we frequently have new projects which would suit them, and they are very good and professional contractors. When the frameworks came in we lost small contractors which almost served Hampshire solely and we've lost the opportunity of using them which is a great shame. So I certainly like to prevent the narrow band because I think the framework needs flexibility in itself. And we've got some contractors on our framework who either through their choice or their performance, don't fit very well at the moment within Hampshire.

So you could see that as an improvement maybe for next time? Something we could push for?

I think we need to have some sort of manner in which we actually.. if we're having issues.. then a sort of warning and then a yellow and red card type scenario really where you know... "we're not happy with you, you're on a warning and if you continue we will remove you from our framework". And at the same time, my understanding is that the framework that we've set up doesn't allow us to replace contractors that either through choice (through them or us) can no longer participate in that framework for that period. Again, we're narrowing down all our choices.

You can remove suppliers and they can choose to remove themselves within frameworks but you can't add because of European legislation

Oh right, thanks. Yeah, if there's a way that you can actually add a contractor to the framework. But you know, the new contractor that I mentioned earlier, I think they would do a fantastic job on the work. And err, there's several others I can think of actually which we don't use now and I think it's a great shame that we don't have that flexibility.

Q19 Do you feel that the use of incentives to encourage good performance within frameworks is worthwhile? Do you have views as to what these incentives should comprise?

I think the incentives through the key performance indicators do certainly work. I mean we get contractors who are very concerned about going into the amber and into the red and they are concerned about how we perceive them. And they have approached us with a level of scoring they're not happy with and asked how they can improve because they don't want to go. So I think that scoring does work quite well. And I think the incentives should comprise of exactly that sort of thing... off the top of my head.

Code name: 07 ME

Organisation: Hampshire County Council

Profession: Engineer

Gender: M

Years experience: 8 years

Seniority: Senior Engineer

Knowledge of frameworks and traditional procurement methods: yes

Q6 In your view, what are the drivers that encourage suppliers to start on time?

Well ultimately, it is predominantly to do with the financial impact which is not just in monetary terms but is predominantly in terms of the incentives which are given through the KPI's to enable them to become more competitive in their tenders. By starting on time you gain more points which may acquire an opportunity to win more work if they are starting on time.

Q7 In your view, what are the drivers that encourage suppliers to finish on time?

I think historically, I've always found in my experiences that in fact the damages clauses were an incentive for contractors to finish on time and they always had an eye on that and could use that to accelerate work if you like. I think that has been added to if you like with the use of KPI's. And again with incentives they score more points and they do finish on time and again that leads to them becoming more competitive in their tenders.

Q8 In your view, what can be done to encourage suppliers to start and finish on time?

I think there's the opportunity... well there's definitely the opportunity to continue with the KPI's, and use of the incentives and also possibly the penalties. But I think we can probably increase the margins if you like. I think a lot of the contractors have probably cottoned on to the fact that there lies an opportunity for starting and finishing on time and they'll go to additional ends to try and ensure that they do start and finish on time. I think we can probably try and push them a little bit harder to be honest and start increasing the margins on which we sort of measure that performance and possibly increase the incentives by giving them more incentives if they do meet that spot on each time.

Q9 In your opinion, do you think that frameworks encourage accurate start and finish dates more than traditional procurement method? Why do you think that is?

Yes I do, because you've got big opportunity with the framework contract to address performance as a one off at the tendering stage and then once that's incorporated you don't need to go through that process on a continuous basis. So I think if you have that, the actual procedures and the time that was involved in trying to incorporate those incentives into each contract, then it does work. So I think that's why they're there predominantly, but also why they are a preferred method.

Q10 In your view, what are the drivers that encourage stronger and closer relationships between parties to a construction project? Why do you think that is?

I think the opportunities that the frameworks give to the contractors which is work over a longer period of time (which is typical of every framework contract), that opportunity to work with the same people on a recurring basis brings that familiarity with all the personnel involved, which I think is key for benefit for the future retainment of people I don't think we all get benefit from it. So I think its important to retain the same personnel throughout our framework as much as possible. Then with that familiarity you gain a better understanding of each others needs, aspirations if you like, towards what each others trying to achieve and get that working more towards a common goal really because its in everybody's interest if the product is successful and its completed on time with agreed budgets, and a that good job is produced because obviously the client wants to see that and the perception of the

supervising section and the people managing and finishing the contracts, that's important themselves. Its in the contractors interest to be seen favourably in order to score highly on the KPI's and hopefully receive future work and be contacted again when contracts are renewed.

Q11 In your opinion, what are the drivers that encourage projects to be completed 'right first time'? Does the procurement help or hinder this?

I think you've got similar issues that you've got with completing on time, and starting on time. Again, you've got the ability to incorporate KPI's to monitor performance which obviously effects drivers and is passed on. So obviously, you could score those in the same way to get an effect which could change performance. And if you end up with a positive result again you can use that in order to make them more competitive and enable them to do more work.

Do you think, obviously the framework procurement involves almost joining contracts together. Do you think that's absent with discrete performance, particularly with the one off job? Do you think they wouldn't take notice of the 'right first time' to the same extent?

Yes, I don't think you necessarily get a common team. It may be a one off. And its quite often dependent on the other teams or the personnel that you've actually got carrying out a job. So if you just took a one off job, it may have a poor performance but it may not be representative of that firm or that company or contractor as a whole. It may just be representative of those individuals. Whereas when you've got a framework contract and you can keep the same amount of people and you can identify a trend and there is a continuing problem, then you can address that by removing those individuals and replacing them. If there's still a problem then you can identify this as a trend which might be in the management structure or the contractor as a whole.

Q12 In your opinion, which procurement method encourages longer term relationships between parties to a construction project? Why do you think this is?

I would think that its definitely the framework contracts. Once you've got that established you've immediately got a longer period of time having that continuity of employment (or opportunity for continuity of employment) which is there for a period of time which is bound to forge better relationships between the parties, because as the start of these framework contracts both parties would be under the understanding that they've got to work together through the forthcoming number of years; so they'd both be aware that they have to work together, there must be some adequate partnering, and then I think as they progress they're likely to be able to develop that relationship anyway. I think taking its natural course these will become better and stronger relationships. Obviously towards the end of the framework period, you'd like to think that the contractor would have one eye on again being successful during the procurement of the renewal of the contract. For the employer or the supervisor team or the client or whomever, there's always going to be an element of.. 'well ok, he's got a couple of bad points but its better than someone we don't really know and there's not going to be any surprises. We know who we're working with' and there's a lot to be said for that I think. You can sort of identify any issues that are going to come up and you can sort of use the same contractors. Whereas if you're always using a different one you never really know what to expect.

Q13 In your view, does the use of key performance indicators help the parties gain better performance with projects? Why do you think this is?

I think its essential as part of the framework contract. I think it probably is a key part of it. The actual quality aspect is what you're looking to achieve as part of the framework and in order to make it work, you've got to have that procedure in place to be able to demonstrate an accurate measure of performance. Without it, everything that is likely to be subjective, although it can be difficult to measure and is likely subjective at times I think, it is perceptual, it needs to be in place, and that's the issue with it. As long as both parties are signing up to that at the start and agrees with the framework as part of the tender, everyone is aware of what's included so I don't think its an issue that can be subjective. I think that for most people that work in the industry, their professional views may vary to some degree though they wont vary widely.

Q14 In your opinion, is the collection of key performance data worthwhile? Is it demanding?

No, its not demanding. I mean they are probably demanding on one or maybe two individuals in order to manage and maintain the process and I think there needs to be a lot of work in order to set it up, but the actual impact on the individuals that are contributing towards the data is minimal really. I mean it's the collecting, analysing and managing of that data which is full time hard work I guess.

Q15 In your view, does the use of a framework help with the balance of risk allocation? Why do you think it is?

I'm not sure that just using a framework changes anything in regards to risk at all. I think the risk allocation is dependent on what each individuals work package is. The opportunity to address or allocate risk is a separate issue to be addressed depending on the works you're trying to take in, the scope of works, the costs of the works are all dependent on what element of risk you want to move around. The framework contract is just a contract to manage the risk. We've got a lot of contracts if you like and in that case we've got a lot of opportunity and scope to be able to move the risk around. Actually, risk is quite dependent on what other contracts you use as part of the individual works package which obviously if you're using the NEC framework then there's various different contracts which you can use under that to pay each individual.

Q16 Which method (traditional verses framework) do you think provides the most effective communication between participants in construction projects? Why do you feel this?

The framework again. Because once it becomes established over the period of time which it covers allows the relationships to become established over that period of time which enables individuals to get to know each other better. Therefore, if you're working with people which you're familiar with then you don't need to go through the process which you would if you were working on an individual contract where you've never met people before, where you've got to get over that first hurdle and

break down the initial barriers. That's the way you can go out and fall straight into a relationship with an understanding of how each individual works and both work towards what you want to achieve.

Q17 Which method (traditional verses framework) do you think allows financial control of a project to be used most effectively? Why do you feel this is so?

I think the framework will give you better financial control through the life of the project from the feasibility stage (or even earlier) right through, because you've got the schedule of rates and that then enables you to give more price certainty to the works that you have tendered at the feasibility stage and get a better idea of what the works are likely to cost. Then you can take that through a project because it has been properly set up. Whereas if you're using a traditional method then obviously you're taking on a lot of different variables.

Q18 Do you feel that we should continue the use of frameworks In the future when the current ones expire in 2012?

Yes

Q19 Do you feel that the use of incentives to encourage good performance within frameworks is worthwhile? Do you have views as to what these incentives should comprise?

Yes, Absolutely. I think they're essential. And we've got the opportunity to develop those a little bit more. Financial... sort of those that give the competitive edge are important. Without a doubt I think it works. Its just as important I think that within the downturn industry. I think if there had been more work around I think we'd see even more so, the benefits of it, and I think the contractors would have seen more benefit from it as well. I think they would have liked to been able to see a little bit more work coming and I think the continuity hasn't really been there, and the opportunities haven't really been there for them, but hopefully that will come good after the next months once things pick up. But yes, I definitely think we should continue when they pick up.

Code name: 08 SJ

Organisation: Contractor/supplier

Profession: Chartered Engineer

Gender: M

Years experience: 30 years

Seniority: Managing Director – Company with £35M p.a. turnover

Knowledge of frameworks and traditional procurement methods: yes both

Q6 In your view, what are the drivers that encourage suppliers to start on time?

Umm, its like a professional thing to do. You start on the time the client wants you to start because that's what you're contracted to do, and it's the best way of satisfying the client. Get the first bit wrong and you've got off to a bad start.

Q7 In your view, what are the drivers that encourage suppliers to finish on time?

Err, well, in different environments we always try to finish as early as we can just for pure commercial merit because obviously the sooner you finish the less your fixed costs are going to be, assuming you're not going to have to increase resources disproportional to those small fixed costs. Err, but in some environments you share with the client the urgency of a situation, for example in the airports, if we're working on the stand and there's an aeroplane due to come in at five o' clock in the morning, not finishing on time is not an option. So when we're working on airways we've got a fixed position and we've got to be finished at 5'oclock in the morning, not finishing on time is not an option. So you know, the whole organisation and all the management and the efforts of everybody is geared around every eventuality for

finishing on time. Other contracts, if you sort of have and understanding of the finish date either the desired finished date and not the cast in stone must finish, you know so the driving force there is purely commercial, you've got to finish as soon as possible to minimize costs. Err, but sometimes its better for all than rather to accelerate and spend money to finish on the date by agreement, you know a revised date can happen. Now that's not, I don't think that's, I can't think of examples off hand, but it certainly happens within the frameworks because you have minor works say at Bournemouth where you've got half a dozen contracts on for Bournemouth City Council and they appreciate that resources aren't necessarily there making some things suffer in order to allow some things you know able to finish at a more critical time perhaps.

Q8 In your view, what can be done to encourage suppliers to start and finish on time?

Umm.. I don't know. I mean... getting in order. Getting in order within an agreed timescale. A program that's well thought out, and not impossible. I mean, its always in our interest to start on time, and its always in our interest to finish on time. I don't think... I mean the biggest driver of course is money. But I don't think that money is part of it. I mean, you start on time, you're not going to get penalised if you're being maximally efficient and you want to finish on time. And to finish on time you need to start on time, so the financial motivations are there. You know. More motivation, more money will always work, but I don't necessarily think that side of it is broken anyway. I think it works.

Q9 In your opinion, do you think that frameworks encourage accurate start and finish dates more than traditional procurement method? Why do you think that is?

Umm, it depends on the type of framework you use. If it's a Hampshire framework where you're select lists and you get contracts based on competition um with traditional contract periods, I think it's the same as any competitive tender for any client. Um the contract sets it all out and by negotiation you agree and you fulfil them. I don't think the framework necessarily effects that as far as I'm concerned. When you have frameworks that have say maintenance where you've got teams of

people full time on maintenance programs, such as a City Council maintenance program, then by continual dialogue and agreement, progress meetings, you get to understand what the priorities are and you work as a team with the full teams understanding to meet the program. Not from a contractual point of view but from an understanding of the client to. You know, it stands to reason that it effects everybody from the bigger driver to the clients and everybody involved. Sub contractors buy into the idea that sort of, this has got to finish on time because there's a functional need. You know, whether its an aeroplane landing or a shop opening or a boat coming under a bridge or whatever. People buy into that, and people always (in my experience) respond positively rather than just being told some arbitrary date. So the framework where you've got this continuous programming, planning, arrangement and working on both sides effects is a good environment to achieve that.

Q10 In your view, what are the drivers that encourage stronger and closer relationships between parties to a construction project? Why do you think that is?

I think trust and respect are absolutely essential. And you only get respect through trust, and you only get trust through behaving professionally and consistently.

Q11 In your opinion, what are the drivers that encourage projects to be completed 'right first time'? Does the procurement help or hinder this?

Yeah, well, the first part of the question. Right first time. Well, I can't understand anybody that wouldn't want to do it right first time anytime. And I really don't think that any responsible person would attempt to do something any other way, other than right first time. Um, having said that, you can get caught out through bad planning, suppliers letting you down, or whether. You know, that's the obvious one. And through no fault of anybody's you can get put in a position where you've got to take a gamble, and the gamble might be on quality because the material is maybe slightly late coming and you haven't got time to replace it and you have to do the best you can. And I don't think you're necessarily err trying to produce a substandard product or end result, what you're trying to do is to achieve the same result, and maybe put a bit of extra work in. For example, if err tarmac comes in on borderline temperature then you've got to get it down quicker, or the concrete might be slightly out but you

know, a bit of extra compaction, a bit of extra working or maybe working on later overcomes it. Um, yeah. Sometimes, you maybe haven't got time to test something but you take a chance. You either put it in or do nothing, and doing nothing is sometimes worse than just taking the chance. So you can get caught out just because and the end of the day you haven't achieved the result that is necessary.

Um, do you think the procurement method helps with that? Or has any effect on it at all? Or...

Umm, I don't think that in any contract anybody would do anything differently in terms of trying to get something right first time. But in a framework there might be a better understanding of what's acceptable and not acceptable because of better relationships, and err you may end up taking joint decisions with clients in which the best decision is to take a chance. Yeah, I mean you could say that the relationships in a framework might mean that you understand the boundaries better of what's right and what's wrong so you can avoid the limits of the boundaries which is better for everybody because sometimes being 100%... providing something of 100% quality means having a big factors at stake and you know, that costs money. Hopefully that makes sense.

Q12 In your opinion, which procurement method encourages longer term relationships between parties to a construction project? Why do you think this is?

The framework does encourage longer term relationships. I mean it stands to reason really that people have got more time to understand each other and build up trust and build up understanding more than anything.

Do you think there's any difference because sometimes suppliers and clients have known each other for a number of years through discrete contracts? And yeah, do you think there's any difference working under a framework for that relationship?

Umm, its difficult. I mean, in my experience its difficult to answer because whenever I've been involved in something like that its always a different level and then you know... The relationships that develop at ground level or graduate level are different

people and we're starting from scratch really. With the relationships that I've built up, people have moved on or there at higher levels and it's a different relationship and it doesn't really effect what's happening on the ground.

Q13 In your view, does the use of key performance indicators help the parties gain better performance with projects? Why do you think this is?

Well, I'm certain that people are aware that they are being measured in every way and there's going to be a greater effort to perform well in those areas. You know, I do believe in policing and discipline and err you know, in my mind any kind of policing will result in performances which are perfected by the policing which in this case is the KPI's.

In your view does the use of KPI's help the parties gain better performance across projects and why is that?

Yes. And I think, you know, the analysis of the data and how that is used, is a difficult area. I mean yes, people are trying their best because they know they are being measured, and they're improving their efforts because they know they are being measured, but using the data. It can be used wrongly and it can create the wrong impressions and err... its just difficult because data is black and white and it doesn't always paint the right picture.

Q14 In your opinion, is the collection of key performance data worthwhile? Is it demanding?

Umm, personally I don't see that its very demanding and a lot of trouble but I appreciate that people do leave it till the last minute very often and so that would tend to point to the fact that perhaps it is difficult. Err, I'm not really accustomed with having to collect data. When I was site agent on frameworks, the KPI's hadn't been invented. Err, and at higher levels I haven't really been involved much in producing the data.

Do you think that it's worthwhile?

Well, yeah as I say. It makes people... well they know they're being measured so they want to do well definitely. I mean provided the messages are getting down to the people that are being measured, which I'm sure it does. Having said that, I have known instances where data has been collected and presented as I said ...??... after the event and people are surprisingly disappointed by it. So the data didn't have any positive benefits during the course of the contract and at the end of the contract, well you know, the moments lost.

Q15 In your view, does the use of a framework help with the balance of risk allocation? Why do you think it is?

Well, I guess it depends on the contract. If it's a select list where tenderers are trying to gain through a competitively tendered process to win the contract then I guess it's the same as any traditional tendering process really in current contract work. Frameworks which involve continual maintenance with fixed teams of operatives, umm certainly fixed management teams and varying labour forces but, there are situations where relationships can be built up and I think inevitably there are agreements made that avoid clients paying for risk unless it happens.

So under the exact circumstances you do think the framework does have some impact?

Well, there is a massive example here which.. when I was err site manager at Gatwick airport err for 7 years on a 3 year PSA schedule arrangement - term of contract they called it in those days but effectively it is a framework, that was competitively tendered, you know we won a second year term based on a re-tender, err.. then we won five years based on a cost reimbursable contract based on tendered rates of labour and percentage uplift for everything to cover the fixed costs. And at that time I was 100% of the view that it was the perfect situation for everybody because the client got exactly what they wanted and they paid for exactly what they got and you know it was beautiful. It was beautifully conceived and it and it worked a treat. Now, cost reimbursable obviously opens the question of whether people are motivated to work efficiently. Now as far as I'm concerned. I've spent five years

working sufficiently with teams of people doing exactly the same thing and I wasn't about to change that now I was under a different contract and nothing changed. The ethos was exactly the same except I didn't have to worry about whether we over estimated the margin, whether we should have a spare resource or whatever because whatever the client wanted they got and by negotiation they got what they wanted and they paid for what they got and it was beautiful. But you know, I do also see that over periods of time, and changes of staff, that inevitably will get eroded. And you know, people start getting lazy and start cutting corners, and you know.. suppliers say 'we want a price increase' and what's the motivation to say no? And you know, I see that and its not anyone's fault its just life. It's the way things happen. So my view of costs being noticeable have changed. Its definitely the way of perfectly balancing risk provided you can manage the efficiency. You know carry on to get the maximum effort of people acting professionally which you know, it can happen and it does happen. You've just got to have the right people and the right relationships and that trust and that commitment to deliver and keep your reputation and carry on doing it.

Q16 Which method (traditional verses framework) do you think provides the most effective communication between participants in construction projects? Why do you feel this?

Well obviously if there's a continuous work programme that people will be together more often (from the client and contractor side, and the supplier chain), then inevitably there's going to be relationships built up and better communication and that's more likely to happen in a framework because of the strong relationships. People make mistakes between jobs, people go in on a tighter price when they need work and increase price when the opposite. So frameworks are a very good way of allowing consistency within teams and developing relationships. It doesn't mean that you're going to develop the right relationships. I mean that isn't a foregone conclusion. You can do.. you can have the wrong people facing each other and if you leave that happening then that's worse than changing people all the time. And unfortunately I think... well, you don't always see it until its too late, and sometimes its difficult to change people.... It gets harder obviously in the modern world where employees have got several more rights and I appreciate that with clients it extremely

hard because well err the local authorities employees have far more rights than private employees. So that side of things, you don't guarantee that you get the best relationships within the framework.

Q17 Which method (traditional verses framework) do you think allows financial control of a project to be used most effectively? Why do you feel this is so?

Financial control of a project to be used most effectively... um... well, the thing is that the use of a framework doesn't guarantee that the finances are controlled. We have frameworks that are scheduled on rates, we have frameworks that are on umm a cost reimbursable basis, and we have frameworks that are mixtures of them both. We have frameworks where you provide mini tenders every time umm.. so I don't think you could generalise and say any framework per se allows better financial control. I mean it depends on the methods of measurement, the schedules you know, and the way that people agree costs under that framework. Um, if it is all based on... in a perfect world with a very complete schedule then in theory it would be very closely controlled. In the real world I mean in civil engineering and especially highway maintenance, with anything involving existing infrastructure or below ground, the parameters are just too wide to be able to accurately schedule things... or to actually rate things on schedules covering all possible ramifications. So then you really are into intelligent people being enlightened and making reasoned judgements based on trust and communication. I suppose we're back to that again.

Umm, it comes down to the people involved. I don't think the framework umbrella necessarily makes it any easier or harder. I think it comes down to the attitude of the people involved. I've experienced attitudes within frameworks which are very good and I've experienced attitudes where they're not so good. I suppose one positive thing is that through the jostling of bids or negotiations its not uncommon for problems to be ironed out during the course of the framework so that financial control will become easier based on previous agreements.

Q18 Do you feel that we should continue the use of frameworks In the future when the current ones expire in 2012?

Umm, well its definitely a big advantage for the contractor to be on a framework. If you're not on the framework it's a disaster. So I would be a big fan if I could be on the next framework.

Q19 Do you feel that the use of incentives to encourage good performance within frameworks is worthwhile? Do you have views as to what these incentives should comprise?

Definitely. Incentives which currently encourage good performance.. well.. I think.. from my point of view. You know, I've been with my company a long time. The ethos has been inbred that you always try to provide good performance and you try to filter that out. I don't really, I couldn't really understand why you wouldn't want to do the best every time. Yet, you're only as good as the people you've got working for you and you cant always do as good as you like. So incentivising it, well, at the end of the day it all comes down to money and whether you get that money by having advanced payments or more turnover with margins that you can live with... its still money at the end of the day. I think they are incentives at the end of the day. I think that's why we do our frameworks because the guaranteed workload (or if you like its more guaranteed than not being in a framework) the turnover does mean you can finance you're fixed costs and you can invest in people and know you're going to get your value out of them. You can invest in recruitment offices, support staff, umm yeah. And if you get the key use out of them then you're more likely to be efficient. So what do the incentives comprise? ... umm guaranteed turnover. It would be nice to have guaranteed profits, umm but the framework doesn't guarantee profits and sometimes you can be knocked into losses. We have been knocked into frameworks where they just don't pay. We still do the best we can in the hope of turning it round, in the hope of getting agreements which improve a situation.. umm you fulfil your contract and move on. I'm not sure whether a financial incentive would improve that performance. I suppose it would do if it meant you could invest more in terms of more people with higher qualifications and higher skills. Yeah, actually going back to the cost reimbursable contract, we had categories and skills. (We still do actually but I'm not involved anymore). So we could be as expensive or as cheap as the client liked and if the client wanted a cheaper price then it would be well.. we could use less skilled people (we have a full range). It might be that it takes longer but it might

be that the quality is slightly less and there may be more risks involved. Invariably, the right decisions are made because the right mix of higher skills and cheaper people are selected and used. So again, the incentive there is that the client gets what they paid for and they don't have to pay for it again.

Code name: 09 SG

Organisation: Hampshire County Council

Profession: Chartered Surveyor

Gender: M

Years experience: 30 years

Seniority: Principal quantity surveyor

Knowledge of frameworks and traditional procurement methods: yes both

Q6 In your view, what are the drivers that encourage suppliers to start on time?

Ok. Well I think other project commitments before and after are relevant a bit. Staff availability is a driver because if we don't have staff available to do that project then that would cause delay. Umm materials and supplier availability and lead in times are also important.

Q7 In your view, what are the drivers that encourage suppliers to finish on time?

Umm, in no particular order – reputation, liquidated damages and financial payment. That's something within the contract which encourages them to finish the project on time. Err commitment of performance to important clients. If suppliers say they're going to finish on time and then don't finish on time, then its reputation. Within the frameworks the promise of potential future work load is an incentive which is almost

like a completion bonus. Another driver for a supplier is their desire to move on to another project.

Q8 In your view, what can be done to encourage suppliers to start and finish on time?

Umm, a reward very similar to our KPI scheme something along those lines. Give contractors sufficient time to compile a program and make sure they adhere to the date stated. Careful monitoring of that program and discussions around it. Give the contractor enough time to mobilise at the start of the project. Don't rush them into starting and into making dates which they can't keep. Don't change the scheme and issue a lot of variations. Keep variations to a minimum that creates fewer delays and fewer confusion problems. Ensure the scheme is properly designed and developed from the offset.

Q9 In your opinion, do you think that frameworks encourage accurate start and finish dates more than traditional procurement method? Why do you think that is?

I don't actually think it does. That being said given the advantage of working with the same contractor means that you can know the key personnel and you can apply a certain amount of pressure on them which perhaps hasn't worked in the past. You can also call them in to discuss issues if they're not working properly. But you know, at the end of the day, the contractor knows he is on a framework and he will be invited to tender for all of the work that is released in it, so there's no real incentive. There's nothing to say he couldn't go on the framework that will create initially if he doesn't meet start finish dates. So I sort of said.. unless there's financial pain, the contractor would not work any differently whether on a framework or not.

Q10 In your view, what are the drivers that encourage stronger and closer relationships between parties to a construction project? Why do you think that is?

Reduced conflict is primarily what properly designed projects without any ambiguity. Probably tendered projects, which are now contracted to submit a fair price for the work without the need to buy a project. Like a framework, the more you

work with a contractor the more you get to understand the way they work, how they price the work, the key staff, what you expect from them, and how you want the final account to be presented and agreed.

Q11 In your opinion, what are the drivers that encourage projects to be completed 'right first time'? Does the procurement help or hinder this?

Ok, I'm going to take that as a two part question. Right first time: Basically means employing the right contractor for a particular project they have the correct expertise for, content monitoring onsite by client representatives (to pick up issues as and when they occur, instead of waiting until the end), ensuring program times and giving contractors time to complete the work rather than rush or delay it. And does this procurement method help with this? Possibly. Whilst I do not think this procurement method makes the contractors to finish right first time; I do believe that constantly working with the same client does help the contractor to understand the clients requirements better which in turn could lead to better cooperation and a build up of financial requirements, which would help contractors to get it right the first time in the future.

So are you saying that the longer term relationship helps?

Yes. Yep. The more they work with each other (particularly the key staff), the more they get to know what the requirements are

Q12 In your opinion, which procurement method encourages longer term relationships between parties to a construction project? Why do you think this is?

Umm, I think the procurement route which describes that is the one which gives the most repeat business such as a framework. And again, its getting to know the key members on both sides which encourages long term relationships. Um, the more a contractor works with a client the more they understand their requirements, which in turn means the client is more inclined to work with them. Contractor teams are encouraged by their management teams to form business relationships to reduce conflict. So I think in a nutshell frameworks are ideal as far as that's concerned.

Q13 In your view, does the use of key performance indicators help the parties gain better performance with projects? Why do you think this is?

Yes, I think they do. They enable both sides to look at historical performance data related to the project to identify where the client team and the contractor team members need to improve. They encourage contractor teams to perform strongly in a chosen area, to gain repeat business, and to not be penalised.

Q14 In your opinion, is the collection of key performance data worthwhile? Is it demanding?

From what I've seen to date, I think yes it is.. very worthwhile. It is demanding, (particularly for our staff based team) for keeping records on top of their other responsibilities. They can create a certain amount of conflict if not recorded accurately, or the parameters are not clearly defined (which has been noticeable on a few projects). Although, it does help to make sure operational goals are met and where possible improved, which is good for us as a client. I think it also means that the better performing contractors increase their chances of winning future work and the client gets the best contractor for particular programs.

Q15 In your view, does the use of a framework help with the balance of risk allocation? Why do you think it is?

Primarily I believe that the procurement method (i.e. the choice of contract for its relevant option) chosen dictates that, rather than the fact that the project's on a framework. I do have a belief that working the framework means that the client is possibly less likely to put risk on the contractor and this is primarily because we work regularly with each other.

Q16 Which method (traditional verses framework) do you think provides the most effective communication between participants in construction projects? Why do you feel this?

I think it comes back to long term relationships. I think that the framework provides the best communication between the parties, simply because of the repeat business and the key personnel working together on a number of similar projects. There's obviously a limited number of contractors as we have a limited number of key staff that we put forward on our projects. So...and err.. I think that helps improve a working relationship.

Do you think that helps improve communication as well?

Yes, I do.

Do you think there's a change in communication through that process.. or...

Yes, I do. I think that the positives are they know what we want, they can talk to us about issues that they've got. They know the information that we require. I guess the negative from our point of view is that ummm, the more you get to know someone, the harder it is to be contractually strict with them if you like and you know.. hit them with that ruler when you don't agree with something. Because you know that on the next project you may well be working with them again

Q17 Which method (traditional verses framework) do you think allows financial control of a project to be used most effectively? Why do you feel this is so?

I think that there shouldn't really be any difference between the levels of financial control between the traditional and the framework. I'd say the only benefit of the framework is that you form a good working relationship with the opposite member and they should know what level of detail you need, and when and how financially you wish to run the project together.

So do you feel it's a question of familiarity really?

Yes, I think it is. If you've got the advantage of working with someone and you've worked together on previous projects, then they know the level of financial control which is required.

Q18 Do you feel that we should continue the use of frameworks In the future when the current ones expire in 2012?

I do yes. The only thing I would suggest is that we expand the selection of available contractors to specialist categories to ensure that we get all the contractors to tendering and that they have all the requirements for the specific projects. Because at the moment we're finding that not all of the contractors have the expertise but because they're on the framework they automatically get to tender for it.

Q19 Do you feel that the use of incentives to encourage good performance within frameworks is worthwhile? Do you have views as to what these incentives should comprise?

Yes, I do believe that the performance indicators improve performance. Incentives should be geared towards things we as an authority are required to provide. In particular: start and performance times, health and safety, general public perception, financial performance and quality of construction. That what incentives should be geared towards.

Code name: 10 WW

Organisation: Hampshire County Council

Profession: Engineer

Gender: F

Years experience: 12 years

Seniority: Design Engineer

Knowledge of frameworks and traditional procurement methods: yes both

Q6 In your view, what are the drivers that encourage suppliers to start on time?

I would say in order to show good performance and maintain their status on the framework to secure more work in the future, generally this creates drivers to start on time.

Q7 In your view, what are the drivers that encourage suppliers to finish on time?

I would say largely the financial implications of not finishing on time and err this will be covered with a poor performance record and a sort of breakdown in relationships which are you know, effective relationships.

Do you think that would cause a poorer relationship then.. between the parties?

Umm I think if it continued. A one off situations not necessarily a problem and I'm sure it could be sorted out but if a contractor is consistently late finishing and there's no good reason for it then that would most certainly effect their performance in the future.

Q8 In your view, what can be done to encourage suppliers to start and finish on time?

Umm the KPI's probably have quite a bearing on that, the incentives to kind of keep them up to scratch. Um, I'm not sure about this but perhaps some financial incentives could be provided? But I don't really know about that. And also, I think its probably important that the provider continues the flow of work through the framework practice to encourage them to want to work for them and to stay with it and for them to know that there's a work stream available.

Q9 In your opinion, do you think that frameworks encourage accurate start and finish dates more than traditional procurement method? Why do you think that is?

From previous experience, I would say yes.

And why do you think that is? Are there any views you have on organisation?

I think again its potentially due to building long term relationships and err I presume it protects that you're on the frameworks and once you remain in that position and wanting to be able to re-tender and be accepted again. Err, yeah, I think its all to do with relationships between the two parties. Its probably cosier. I mean compared to the traditional method. It's a bit more personal and interesting.

Q10 In your view, what are the drivers that encourage stronger and closer relationships between parties to a construction project? Why do you think that is?

I would say that one of the most important things is the communication together with a clear indication of responsibilities. Again, its got to be through communication. I like the early involvement between contractor and client which I've been reading up about. And err, possibly the selection of the type of contract and a long term framework as well to make sure it suits the work involved.

Q11 In your opinion, what are the drivers that encourage projects to be completed 'right first time'? Does the procurement help or hinder this?

Um, I would say the main driver again would be financial in all respects and err.. the procurement method. I would say the framework procurement does encourage this rather than the traditional method. Time delays can be avoided as well through the use of the framework.

Q12 In your opinion, which procurement method encourages longer term relationships between parties to a construction project? Why do you think this is?

I should think the framework should encourage longer term relationships by its very nature. And because the client and the contractor learns how each other works and sort of become comfortable dealing... you know they know all the ins and outs and helps deal with the various people and create professional relationships as well.

Do you think that could cause a problem as well? Do you think they can get too comfortable?

Umm, yes. From my experience yes. And I've been thinking about it. I think they could become complacent and just think 'well, we'll get the work anyway'. Um, so there needs to be still a competitive nature maintained at the same time as a chance to develop a relationship.

Q13 In your view, does the use of key performance indicators help the parties gain better performance with projects? Why do you think this is?

I would think yes. I've not been involved with it very much but by all accounts I would say that it does encourage this.

Do you feel that this gives a focus on to projects or...

Um yes and as I say its just a means of recording as well. Not only for your clients, but for your own company. It's a useful means for recording performance on particular jobs and you can then analyse what went wrong

Q14 In your opinion, is the collection of key performance data worthwhile? Is it demanding?

The answer to this question is yes. I do believe that's its very worthwhile collecting performance data. Second question, I actually don't have any experience doing it so I think it probably is quite demanding because everybody is busy with their jobs and its something that needs to be fitted in and probably gets complained about. So yes, I'm sure it is.

Q15 In your view, does the use of a framework help with the balance of risk allocation? Why do you think it is?

Um, this one I wasn't too sure on how to answer I'm afraid. I'm not.. I don't have an in-depth knowledge of contract and risk. I know the basics of it, and I know that supposedly risks are supposed to be allocated to whoever best able to manage them in these sorts of contracts. But whether it really helps much, I don't really know I'm afraid.

Q16 Which method (traditional verses framework) do you think provides the most effective communication between participants in construction projects? Why do you feel this?

My answer to that was that in an ideal world there shouldn't be any difference. Communication is essential. Good communication is essential on projects no matter what procurement method you're using.

So you feel they're pretty evenly balanced either way?

I would say that they ought to be evenly balanced, yeh. You might be obliged to communicate better in a framework for instance, but I don't think that should be the case. I think it should be effective no matter what.

Q17 Which method (traditional verses framework) do you think allows financial control of a project to be used most effectively? Why do you feel this is so?

Err, once again this is outside my area of expertise completely. So I really don't know the answer to that question.

Q18 Do you feel that we should continue the use of frameworks in the future when the current ones expire in 2012?

My view is yes. Again in my limited experience it seems like a good idea. From what I've heard about it and from what I've dealt with so far the performance under frameworks seems better.

Q19 Do you feel that the use of incentives to encourage good performance within frameworks is worthwhile? Do you have views as to what these incentives should comprise?

I think incentives are probably a good idea. Umm, I'm not really sure what they should be but I suppose its all to do with preference of the key performance indicators. I know we've sort of got a system of the red, green and amber light which I think will probably count as an incentive. With regards to financial incentives I'm not sure what sort of things are permissible. But I'm sure there are things that could be done but again that isn't my normal area so I'd be interested to learn more.

Do you feel that just being placed in a zone is an incentive enough for people to improve?

Um, I mean it would be to me. If I was placed in the yellow or red zone, I would be keen to try and get out of it. So I think again for that type of thing it probably works well.

Appendix 12: Node classification summary**Node Classification Summary****Participants interviews**

Attribute Value	Attribute Value Description	Number of Nodes Assigned
------------------------	------------------------------------	---------------------------------

Classification Name: Person**Attribute Gender**
Name:

Female	2
Male	8

Attribute Prior knowledge of frameworks
Name:

No	1
Yes	9

Attribute Prior knowledge of traditional procurement methods
Name:

Yes	10
-----	----

Attribute Profession
Profession of interviewee

Engineer	8
Quantity Surveyor	2

Attribute Seniority
Seniority of position within the organisation

Managing position	4
Senior position	6

Attribute Value	Attribute Value Description	Number of Nodes Assigned
------------------------	------------------------------------	---------------------------------

Attribute Years of experience**Value of years of experience within the construction industry**

11 to 20 years	3
21 to 30 years	4
31 to 40 years	3

Appendix 13: Interview Coding Summary

03/01/2012 20:28

Coding Summary

Participants interviews

03/01/2012 20:28

Hierarchical Name	Aggregate Coverage	Number Of Coding	Number Of Users Coding
-------------------	--------------------	------------------	------------------------

Document**Internals\\Framework interview 01**

Node				
Nodes\\All procurement methods produce same project costs	No	4.00 %	1	1
Nodes\\Communication	No	1.12 %	2	1
Nodes\\Competition	No	7.20 %	2	1
Nodes\\Contract conditions	No	3.70 %	2	1
Nodes\\Frameworks give opportunity	No	2.30 %	1	1
Nodes\\Frameworks unique	No	2.20 %	1	1
Nodes\\Incentives encourage performance	No	1.70 %	1	1
Nodes\\KPI's concentrate minds	No	0.80 %	1	1
Nodes\\KPI's improves performance	No	0.80 %	1	1
Nodes\\KPI's relevant	No	2.90 %	1	1
Nodes\\Late completion costs money	No	4.30 %	2	1
Nodes\\Mobilisation should be sufficient	No	0.80 %	1	1
Nodes\\Performance better in frameworks	No	4.70 %	3	1
Nodes\\Public sector places relationship barriers	No	7.40 %	2	1
Nodes\\Quality is improved with frameworks	No	6.20 %	2	1
Nodes\\Relationship - special with frameworks	No	8.80 %	2	1
Nodes\\Relationships are about people	No	1.00 %	1	1
Nodes\\Relationships are less effective with traditional procurement	No	4.80 %	1	1
Nodes\\Relationships public and private sector are different	No	2.40 %	1	1
Nodes\\Relationships stronger and wider	No	3.99 %	2	1
Nodes\\Risk less with frameworks	No	1.40 %	1	1
Nodes\\Time is variable in discrete projects	No	0.40 %	1	1
Nodes\\Working together	No	3.10 %	1	1
Nodes\\01	No	100.00 %	1	1

03/01/2012 20:28

Hierarchical Name	Aggregate Coverage	Number Of Coding	Number Of Users Coding
Internals\\Framework interview 02			
Node			
Nodes\\Behaviour	No	2.10 %	1
Nodes\\Communication	No	4.42 %	12
Nodes\\Competition	No	1.49 %	1
Nodes\\Finances controlled	No	2.58 %	1
Nodes\\Finish on time	No	3.50 %	1
Nodes\\Frameworks unique	No	2.80 %	1
Nodes\\Incentives encourage performance	No	1.40 %	4
Nodes\\KPI's concentrate minds	No	2.20 %	1
Nodes\\KPI's relevant	No	1.78 %	4
Nodes\\Quality is improved with frameworks	No	1.00 %	1
Nodes\\Relationship - special with frameworks	No	2.64 %	2
Nodes\\Reputation	No	2.50 %	2
Nodes\\Risk balance	No	2.60 %	1
Nodes\\02	No	100.00 %	1

Internals\\Framework interview 03

Node			
Nodes\\Communication	No	2.70 %	4
Nodes\\Contract conditions	No	4.72 %	2
Nodes\\Incentives encourage performance	No	3.60 %	2
Nodes\\KPI's concentrate minds	No	2.77 %	2
Nodes\\KPI's improves performance	No	2.40 %	1
Nodes\\KPI's relevant	No	3.20 %	1
Nodes\\Mobilisation should be sufficient	No	0.63 %	2
Nodes\\Relationship - special with frameworks	No	3.91 %	2
Nodes\\Relationships stronger and wider	No	1.85 %	2
Nodes\\Reputation	No	0.90 %	3
Nodes\\Risk less with frameworks	No	0.75 %	1
Nodes\\Working together	No	2.30 %	1
Nodes\\03	No	100.00 %	1

Hierarchical Name	Aggregate Coverage	Number Of Coding	Number Of Users Coding
Internals\\Framework interview 04			
Node			
Nodes\\Communication	No	2.17 % 3	1
Nodes\\Competition	No	1.28 % 1	1
Nodes\\Incentives encourage performance	No	3.20 % 1	1
Nodes\\KPI's concentrate minds	No	0.86 % 1	1
Nodes\\KPI's improves performance	No	2.10 % 3	1
Nodes\\Quality is improved with frameworks	No	1.32 % 2	1
Nodes\\Relationship - special with frameworks	No	1.04 % 2	1
Nodes\\Relationships public and private sector are different	No	1.78 % 1	1
Nodes\\Relationships stronger and wider	No	2.26 % 2	1
Nodes\\Risk balance	No	3.58 % 1	1
Nodes\\04	No	100.00 % 1	1

Internals\\Framework interview 05

Node			
Nodes\\Behaviour	No	2.18 % 1	1
Nodes\\Communication	No	7.39 % 2	1
Nodes\\Contract conditions	No	4.53 % 3	1
Nodes\\Finances controlled	No	1.73 % 1	1
Nodes\\Frameworks give opportunity	No	2.65 % 1	1
Nodes\\Frameworks unique	No	0.65 % 1	1
Nodes\\Incentives encourage performance	No	4.85 % 2	1
Nodes\\KPI's improves performance	No	4.55 % 6	1
Nodes\\Late completion costs money	No	2.90 % 1	1
Nodes\\Mobilisation should be sufficient	No	0.32 % 1	1
Nodes\\Relationships are less effective with traditional procurement	No	3.87 % 2	1
Nodes\\Relationships stronger and wider	No	1.69 % 3	1
Nodes\\Reputation	No	0.40 % 1	1
Nodes\\05	No	100.00 % 1	1

Hierarchical Name	Aggregate Coverage	Number Of Coding	Number Of Users Coding
Internals\\Framework interview 06			
Node			
Nodes\\Communication	No	4.54 % 2	1
Nodes\\Competition	No	1.15 % 1	1
Nodes\\Contract conditions	No	4.53 % 2	1
Nodes\\Data collection not demanding	No	7.05 % 1	1
Nodes\\Framework restricts suppliers	No	7.99 % 2	1
Nodes\\Frameworks give opportunity	No	2.25 % 1	1
Nodes\\Incentives encourage performance	No	4.87 % 2	1
Nodes\\KPI's concentrate minds	No	3.50 % 1	1
Nodes\\KPI's improves performance	No	3.50 % 1	1
Nodes\\Late completion costs money	No	5.14 % 2	1
Nodes\\Performance better in frameworks	No	6.06 % 2	1
Nodes\\Relationships stronger and wider	No	9.36 % 3	1
Nodes\\Reputation	No	0.98 % 1	1
Nodes\\06	No	100.00 % 1	1

Internals\\Framework interview 07

Node			
Nodes\\Behaviour	No	2.94 % 1	1
Nodes\\Communication	No	14.96 % 4	1
Nodes\\Contract conditions	No	3.59 % 1	1
Nodes\\Data collection not demanding	No	3.20 % 1	1
Nodes\\Finances controlled	No	4.43 % 1	1
Nodes\\Incentives encourage performance	No	16.66 % 4	1
Nodes\\KPI's improves performance	No	2.87 % 1	1
Nodes\\Late completion costs money	No	3.54 % 1	1
Nodes\\Quality is improved with frameworks	No	4.23 % 1	1
Nodes\\Relationships are about people	No	3.95 % 1	1
Nodes\\Relationships stronger and wider	No	7.55 % 2	1
Nodes\\07	No	100.00 % 1	1

Hierarchical Name	Aggregate Coverage	Number Of Coding	Number Of Users Coding
Internals\\Framework interview 08			
Node			
Nodes\\Behaviour	No	0.79 % 1	1
Nodes\\Contract conditions	No	11.12 % 4	1
Nodes\\Data collection not demanding	No	1.38 % 1	1
Nodes\\Finances controlled	No	1.19 % 1	1
Nodes\\Incentives encourage performance	No	9.18 % 2	1
Nodes\\KPI's concentrate minds	No	1.73 % 1	1
Nodes\\KPI's improves performance	No	1.08 % 1	1
Nodes\\KPI's relevant	No	2.21 % 1	1
Nodes\\Late completion costs money	No	3.51 % 2	1
Nodes\\Performance better in frameworks	No	3.27 % 1	1
Nodes\\Relationships are about people	No	2.44 % 1	1
Nodes\\Relationships stronger and wider	No	4.19 % 3	1
Nodes\\Reputation	No	5.19 % 4	1
Nodes\\Trust and respect	No	0.81 % 1	1
Nodes\\Working together	No	0.79 % 1	1
Nodes\\08	No	100.00 % 1	1

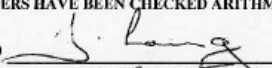
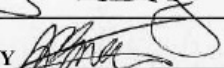
Internals\\Framework interview 09

Node			
Nodes\\Communication	No	4.69 % 1	1
Nodes\\Contract conditions	No	5.36 % 2	1
Nodes\\Framework restricts suppliers	No	4.03 % 1	1
Nodes\\Frameworks give opportunity	No	5.59 % 1	1
Nodes\\KPI's concentrate minds	No	3.38 % 1	1
Nodes\\KPI's improves performance	No	8.11 % 3	1
Nodes\\KPI's relevant	No	3.39 % 1	1
Nodes\\Late completion costs money	No	1.69 % 1	1
Nodes\\Performance better in frameworks	No	1.97 % 1	1
Nodes\\Relationships are about people	No	4.24 % 1	1
Nodes\\Relationships are less effective with traditional procurement	No	4.94 % 2	1
Nodes\\Relationships stronger and wider	No	2.32 % 1	1
Nodes\\Reputation	No	2.68 % 1	1
Nodes\\Risk balance	No	1.82 % 1	1
Nodes\\09	No	100.00 % 1	1

Hierarchical Name	Aggregate Coverage	Number Of Coding	Number Of Users Coding
Internals\\Framework interview 10			
Node			
Nodes\\All procurement methods produce same project costs	No	3.44 % 1	1
Nodes\\Communication	No	7.00 % 2	1
Nodes\\Data collection demanding	No	3.18 % 1	1
Nodes\\Incentives encourage performance	No	4.69 % 1	1
Nodes\\KPI's improves performance	No	5.84 % 1	1
Nodes\\Late completion costs money	No	6.15 % 2	1
Nodes\\Performance better in frameworks	No	2.17 % 1	1
Nodes\\Relationships are less effective with traditional procurement	No	4.11 % 1	1
Nodes\\Relationships stronger and wider	No	5.14 % 1	1
Nodes\\Reputation	No	2.24 % 1	1
Nodes\\10	No	100.00 % 1	1
Reports\\Coding Summary Report			

Appendix 14: Copy of quantity surveyors tender report

FILE

<p>COUNTY SURVEYOR'S DEPARTMENT</p> <p>QUANTITY SURVEYOR'S TENDER REPORT</p> <p>SCHEME: Redbridge Causeway – Eastbound Safety Barrier.</p> <p>JOB No: C.J005426.01</p> <p>ALL TENDERS HAVE BEEN CHECKED ARITHMETICALLY AND IN ADDITION THE TWO LOWEST HAVE BEEN FULLY EXAMINED.</p> <p>SIGNED  (Quantity Surveyor)</p> <p>CHECKED BY  DATE 23rd Nov 2009</p>		
Order of Tender	Name of Contractor	Report on Tender
		<p><u>Framework 2 – NEC Option B</u></p> <p>The construction industry appears to be especially competitive and the lowest tender is approximately £77,000 below the QS Estimate.</p> <p>It is recommended that the lowest tenderer be accepted.</p>
1	Dyer & Butler Ltd.	<p>The Bill of Quantities with tendered rates has been arithmetically checked to give a Tender total of £ 293,145.09</p> <p>Tender Assessment Value £ 330,357.40</p> <ul style="list-style-type: none"> - Preliminaries equate to approx. 33% of the tendered sum. - People Overheads stated as 9.0% - Equipment Overheads stated as 10.0% - Percentage Fees – Direct 6.0%, Sub contract 5.5% - “Nil” rates have been inserted against items in relation to Dismantling of Offices [1.1.G, H & I]. - “Nil” rate has been inserted against General site clearance [2.1.A] - “Nil” rate has been inserted against Formwork [2.16.C] - All other rates appear acceptable and comparable <p>Appendix 1 – Equipment List – Many items have been priced at £0.00 or other appearingly low rates. The contractor has confirmed that CE's will be evaluated using these rates [where appropriate].</p>

1

4	Geoffrey Osborne Ltd.	<p>The Bill of Quantities with tendered rates has been arithmetically checked to give a Tender total of <u>£ 439,642.04</u></p> <p>Tender Assessment Value <u>£ 515,815.46</u></p> <p>Tender may be qualified by covering letter [Shutting down of 11kVA cable]</p> <ul style="list-style-type: none"> - Preliminaries equate to approx. 51% of the tendered sum. - People Overheads stated as 0.0% - Equipment Overheads stated as 0.0% - Percentage Fees – Direct 1.0%, Sub contract 1.0%. - “Nil” rate has been inserted against Information Boards [1.1.J] - “Nil” rates have been inserted against some items in relation to the Temporary Diversion of Traffic [1.2.E, H & K] - “Nil” rate has been inserted against EO for insitu casting of slip form barrier [2.2.G]
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QS Estimate £370,000

C.J005426.01		REDBRIDGE CAUSEWAY EASTBOUND SAFETY IMPROVEMENTS		19-Nov-09	
Bill	Description	D & B		Mildren	
		Colas		Osborne	
BILL 1	SERIES 100 - PRELIMINARIES	96,146.00	171,342.10	224,816.59	
BILL 2	SERIES 200 - SITE CLEARANCE	5,518.72	8,034.30	7,428.88	
	SERIES 400 - ROAD RESTRAINT SYSTEMS [VEHICLE AND PEDESTRIAN]	113,212.79	120,107.44	123,235.34	
	SERIES 500 - DRAINAGE AND SERVICE DUCTS	18,558.81	14,824.48	19,874.81	
	SERIES 600 - EARTHWORKS	8,639.76	10,325.70	7,316.54	
	SERIES 700 - PAVEMENTS	7,505.81	11,565.86	8,268.02	
	SERIES 1100 - KERBS FOOTWAYS AND PAVED AREAS	438.34	570.40	582.16	
	SERIES 1200 - TRAFFIC SIGNS AND ROAD MARKINGS	4,654.37	3,739.02	4,740.94	
	SERIES 1700 - STRUCTURAL CONCRETE	7,593.80	10,276.95	13,316.40	
	SERIES 2000 - WATERPROOFING FOR STRUCTURES	5,149.23	9,123.70	4,750.78	
	SERIES 2300 - BRIDGE EXPANSION JOINTS AND SEALING OF GAPS	8,728.06	12,741.89	6,991.58	
	PROVISIONAL SUMS	17,000.00	17,000.00	17,000.00	
TENDER TOTAL (£)		293,148.09	347,651.64	439,642.04	
	People Overhead	13,500.00	0.00	0.00	
	Equipment	6,080.00	16,110.00	65,640.00	
	Direct Percentage Fee	180,264.37	215,415.64	219,821.02	
	Subcontracted Percentage Fee	112,880.72	132,236.00	219,821.02	
	TOTAL FOR TENDER	330,357.39	381,144.22	615,815.46	
	ASSESSMENT PURPOSES	[330,357.39]	[381,144.22]	[615,815.46]	
	Sub Total, Excluding Prelims	196,999.09	218,309.54	214,325.45	
	Variance from lowest Tender	-	54,505.55	145,498.95	
	Variance from lowest Assessed Tender	-	50,766.83	185,458.07	
	Prelims (%age of Tender Total)	32.8%	37.2%	51.1%	
Summary		Summary			

(H:\000000511815)_Redbridge Causeway - Tender Comparison

23/11/2009

Appendix 15: Project financial production values

Appendix 16: Example of project fee cost report

TRLIST4

Project Group Activity Staff Report

Printed 07-Jun-2012

Pillar Software Ltd

Page 1

(TimeRec.Project) = '170203' and (TimeRec.Posted)

Profession	Activity	Staff	Hours	Cost	Gross
178263	A327 MAJOR MAINTENANCE				
JR2A	HIGHWAY DESIGN	DORAN David Oram	2.00	0.00	43.00
JR2A	HIGHWAY DESIGN	MITCHELL Matt Tople	4.00	0.00	130.00
JR2A	HIGHWAY DESIGN	PFOXX Peter Fox	181.50	0.00	8,046.75
JR2A	HIGHWAY DESIGN	RWAB Rob Ward	3.50	0.00	67.50
JR2A	HIGHWAY DESIGN	BHAYB Brett Huxley	0.50	0.00	29.95
JR2A	HIGHWAY DESIGN	KACLL Kathie Murray	58.00	0.00	3,140.46
JR2A	HIGHWAY DESIGN	MEAT Mark Beaton	4.50	0.00	210.36
JR2A	HIGHWAY DESIGN	BHAYB Brett Huxley	0.50	0.00	29.95
JR2A	HIGHWAY DESIGN	DAVIS Philip Davis	370.50	0.00	15,783.65
JR2A	HIGHWAY DESIGN	MBATC Mark Battholator	523.00	0.00	40,062.89
JR2A	HIGHWAY DESIGN	PFOXX Peter Fox	541.25	0.00	25,205.86
JR2A	HIGHWAY DESIGN	TKILL Tim Kellingback	10.50	0.00	367.50
JR2A	HIGHWAY DESIGN	WHORV Wayne Horneath	01.50	0.00	1,537.95
JR2A	HIGHWAY DESIGN	KACLL Kathie Murray	11.50	0.00	546.75
JR2E	LAND SURVEY	RSFEARH Stewart	181.00	0.00	3,831.50
JR2E	LAND SURVEY	GEORGIN Morris	94.00	0.00	2,669.00
JR2E	LAND SURVEY	HGREERH Green	126.00	0.00	2,961.50
JR2E	LAND SURVEY	IOOX Ian Cox	125.00	0.00	4,530.01
JR2E	LAND SURVEY	NCHAM Neville Chamberlain	162.50	0.00	6,012.50
Totals for A327 MAJOR MAINTENANCE			1,839.25	0.00	115,430.76
Grand Total			1,839.25	0.00	115,430.76
					<u>115,430.76</u> ✓

Appendix 17: Project engagement and performance monitoring transaction costs

