Strategic Procurement in Construction:

Towards better practice in the management of construction supply chains

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Dedicated to

all those with enquiring minds and
those who have supported
this research project.

Preface

That there is a need to radically improve construction projects in the UK would generate very little dissent. A series of studies and reports since the Second World War have all concluded that something must be done.

The most recent of these reports, by Sir Michael Latham, has generated great interest and energy. Twelve Working Groups, representing bodies from all sectors, working under the banner of the Construction Industry Board, have addressed the recommendations for change. I am hopeful that Latham's Report and its ensuing activities will not just translate in to yet another contract form as a panacea for the industry's ills. I am optimistic because there are now real drivers for change and a recognition that contractors alone are not to blame; all sectors of the industry, including clients, have a major part to play.

And clients *will* play their part as they realise, in this customer-driven world of falling trade barriers, that a construction industry with low input costs and high output costs means competitive disadvantage – slow response to market demand, excessive demands on hard-earned cash and high on-going running costs.

Traditionally, clients – aided or even led by their professional advisers – have procured construction on a tactical basis. This approach has left very little scope for continuity or improvement. The overwhelming significance of tender prices as the basis for assessing value and for the selection of the contractor leads to adversarialism, diverts attention from total acquisition cost, life-cost and value, and has perpetuated fragmentation in the industry. A more strategic approach is required, with longer-term relationships enabling the formation of teams focused on adding

value and improving the profitability of individual companies, through efficient working.

All is not doom and gloom, there are a significant number of projects that have been wholly successful, and many that have been partially successful. There are also clients who have quietly made progress in the development of new relationships with suppliers. Some of us also believe that established contract forms can also be made to work – although usually only when they are put in the bottom drawer whilst clients, professionals and contractors work together.

Not every client-supplier or contractor–sub-contractor relationship should be identical, and some science is required to define a portfolio of supply relationships. This publication, and its underlying research, was commissioned to test how the methodology developed by Andrew Cox could provide guidance about the types of relationships required, and perhaps, confirmation that the theory can work in practice.

The research has also attempted to identify the characteristics of successful practice. This has been based on an analysis of UK and non-UK examples. For those who believe that the USA, and Japan are so much better at construction than the UK the research looks at those industries in context, to identify what is better practice and how it might be implemented successfully in the UK.

The importance of this research and its findings for BAA plc is self-evident. BAA plc is viewed as a monopoly operator of airports and is heavily regulated, just like privatised utilities; it is treated just like the publicly-owned airports across Europe and so is required to comply with the EU Directives. This regulation drives change, but there is also the reality that air travel is a growth industry. Airports, therefore, utilise large tracts of valuable real estate but the development of new facilities is constrained (largely to existing sites).
This is unfortunate because passengers are increasingly sophisticated and demanding; and any expansion has to parallel

existing operations. Given that there *is* competition between airlines and airports, BAA plc sees it as imperative that new construction work should represent real value and cause minimum disruption. This requires significant improvement in the way in which the construction supply chain is managed. BAA plc has embarked on its own programme of change and funded the research in this publication in order to identify examples of better practice for itself, to build confidence in the path it has chosen, and also to provide the basis for a dialogue on improvement in the industry.

Martin Sykes
Group Supply Chain Director
BAA plc

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Section C: Better Practice Operational Tools and Techniques for Effective Construction Procurement

Section D: Towards a Theoretical and Practical Synthesis

Introduction: On The Appropriateness of Strategy and Operational Practice in Construction Procurement

This book has been written in order to contribute to the debate about best practice in construction procurement. At the outset it should be made plain that the authors do not subscribe to the view that there is any such thing as best practice. The main argument in this book is that there can never be a best practice, only better practice, in construction procurement.

The reason for arriving at this conclusion is straightforward. If there was a best practice in the effective management and delivery of construction related projects, then, it would have been discovered many centuries ago, and it would have been successfully copied and replicated by many individuals and companies since then. The idea of a best practice is, therefore, flawed because it assumes that there is an end state of management behaviour that is always likely to be the appropriate way to achieve success under *all* circumstances. This cannot be true because technological and competitive circumstances do not remain the same.

The topic that is worth discussing in more detail is, therefore, not best practice, but appropriateness.[1] The concept of appropriateness implies that, when deciding what to do, individuals must choose wisely from amongst the range of potential managerial tools and techniques that are available to them, under the specific circumstances which confront them. It also means that individuals, and the companies they represent, must understand that any operational practice can only be effective if it appropriately aligned

with a clearly defined strategic vision over means and ends. This vision, furthermore, cannot, and never should, be the same as that of every other company, because sustainable business success is nearly always linked to the possession of unique resources and capabilities.

If uniqueness is a key attribute of sustainable success it follows, therefore, that there can never be a single answer to the question of which operational practices to pursue for success. By understanding that there can never be a definitive best practice in business management it becomes possible to recognise that there will, however, always be some things that managers can do that are more appropriate than others, under specific circumstances. Because the world is contingent (ever changing) this implies that, for any given problem which an individual manager faces, there will always be some practices that are more appropriate than others to assist in the achievement of a specific valued outcome. These, by definition, are better practices. It is not a fixed best practice that must be sought, therefore, rather it is a recognition of what is appropriate, and a realisation that whatever this may be today, it may not be so tomorrow.

This may seem an academic point to the busy practitioner who might chance upon these pages. It is, however, not just a semantic or academic point; this distinction goes to the heart of the message that this book is seeking to provide for the construction industry. The reader is asked to pause and to reflect for a moment on what it is that they are searching for when they read a book like this. If they are honest with themselves they will be searching for the same thing that practitioners in every industry are searching for. They will be searching for the 'Holy Grail' of best practice.

By this one means that practitioners are looking for the answer that provides the solution to all of the problems which they face managerially. Unfortunately, this desire to discover the single solution (best practice), that will allow the practitioner to avoid the need for thought and risk taking, is an illusion. It does not exist. This is because, in the opinion of the authors, there can be no single practice that will always be the best (i.e. provide the right solution) for every practitioner in construction (or any other sector or industry) under all circumstances.

The world is much more complicated than this. In reality practitioners must operate in a world in which there is always the need to choose between only partially understood practices and outcomes, and in which there are always risks of uncertainty. Effective procurement management cannot, then, be about the avoidance or minimisation of such risks and uncertainties. If risks can be eradicated, and construction outcomes made certain, then it is doubtful whether there would be any real opportunity for individuals or companies to make a profit.

Effective construction procurement, just like effective business management in any industry, must therefore start from the recognition of the need for individuals and companies to understand the risks that are the basis on which business success is built.[2] In the absence of an understanding that risk taking is the basis of business success, no amount of effort in seeking better construction practices will lead to increased profitability. Secondly, it can be argued that the essence of better practice is the ability to know the full range of tools and techniques that are available to allow individuals (or companies) to leverage their business position effectively.

One of the major weaknesses in business thinking is the inability of practitioners, and academic writers alike, to accept that business success is, ultimately, about leverage. By leverage one means the ability to obtain control over particular resources in a supply chain, and then to manage those resources in such a way that it becomes possible to appropriate value (profits) for oneself, against the interests of customers, suppliers, employees and competitors. This ability to develop a corporate understanding of what leverage means, and what is required operationally to allow for effective value appropriation in specific supply chains, is what we mean here by a strategic approach to construction procurement.

Readers of this volume will quickly come to understand what is meant by this, because they will gradually recognise that the cases of better practice in construction procurement presented here are about *effective leverage*. The point is, however, that the tools and techniques that have been used to achieve effective leverage in each of the case studies presented herein are not always the same. On the contrary, it is clear, as the case material presented here

demonstrates, that only certain tools and techniques are appropriate to achieve effective leverage, under specific circumstances.

The reason for this to be so ought to be obvious to the informed reader. It is because each of the individuals and companies that are the subject of our case studies are operating within very different construction supply chains, and with varying degrees of relative power over one another, and over other supply chain participants. It follows, therefore, that, if the supply chain circumstances in which a company is operating differ, then the appropriate thing for any company to do to achieve effective leverage and value appropriation, will also be contingent.

This implies that there can be no single answer for anyone to pursue. Individuals and companies have, first, to recognise the specific circumstances that face them, as well as the universe of potential tools and techniques that are available to them to achieve a competitive or strategic advantage. Only then can they move to the second phase, which is to link their strategic goals with the operational reality that faces them. This is, by definition, what a strategic approach to construction procurement always looks like. It is not a particular practice at all; it is a way of thinking about what is appropriate under specific circumstances.[3]

This may seem an highly academic and theoretical argument to those busy practitioners who have begun to read these pages, and they may be tempted to put down this volume now. The authors believe that this would be a pity because, while it is clearly a theoretical issue, it is not just an academic point. The reason for this is because what has been said about the need for practitioners to adopt a way of thinking (rather than specific practices) goes to the heart of better management in construction specifically, and in business management as a whole.

Practitioners tend to put down immediately those books which ask them to think, and that are not the latest academic or consultant DIY guide to the best practices to business success that have been gleaned from the operational practices of major companies. There are a host of reasons for this. One major reason is, of course, because the practitioner genuinely does not have the time to think through in detail what is being argued. The problem is that, because they are busy people with short-term operational drivers,

practitioners believe that they cannot afford the luxury of thinking about first principles. As a result they end up pursuing short-term, simple solutions that have clearly worked for others, and which they hope may just work for them.

This is obviously one of the major problems with current practitioner thinking in construction management, and in business in general. Because practitioners are busy, and under time pressure to deliver, they commonly pursue a benchmarking approach to business success. By this one means a desire to monitor, copy and adapt the operational practices of others – particularly if there has been a clear, demonstrable and quantifiable benefit to a particular company. The reasons why practitioners use this methodology has been critiqued elsewhere.[4] It is worth stressing here, however, that the benchmarking mentality, while not wholly wrong, is only rarely the most appropriate way for most companies to structure their operating and strategic practices.

Why should this be so? The reason is self-evident after a moment's reflection. Sustainable business success is ultimately based on being in possession of an inimitable or non-replicable, or unique, series of resources or capabilities. It follows, therefore, that if a company wants to be successful it must understand how to develop superior competencies in relation to others now and in the future. This implies that companies must avoid at all costs being in a position in which, because they do not understand what is the basis for superior performance, they must base their strategy on the copying of the practices of those who do know how to develop unique and distinctive capabilities.

The problem is that, while this may appear logical common-sense once it is explained, for most practitioners it is also practical common-sense for them to benchmark because it allows them to improve their current performance, with minimal effort. For most practitioners it seems, therefore, perfectly sensible to argue that, if their company has practices that are inferior to another, then, if they can copy and adapt the practices of others to their own purposes, they will be successful. The logic here is that they will be able to catch up to the current operating practices of their competitors, without undue risks.

A moment's reflection will, however, lead one to recognise that, if playing catch-up is all that a company does, there is a grave danger that the individuals within such a company may never fully understand the underlying reasons why a particular practice has been appropriate in the past, or is now, for the specific company that is being copied. This failing can lead to two major problems. On the one hand, the company playing catch-up may be pursuing wholly inappropriate practices, that are no longer relevant given the circumstances that are now prevailing. On the other hand, the practices may be appropriate but, because the company playing catch-up has not understood the underlying reasons for the practices being introduced in the first place, the catch-up company may not know what to do when circumstances change in the future. They may, as a result, be locked into outdated practices and ways of thinking.

Some of the practitioners who read these pages may accept what has been said, and argue that this is just common sense (which it is), and that they already know this. If that is the case then this book may have little to teach them. This book has written, however, because experience leads the authors to conclude that such a form of sense (in a business context) does not appear to be all that common. This conclusion has been arrived at, in part, because of the relatively uncritical attachment which the authors have noticed amongst some in the construction industry in relation to the recently much-praised Latham Report (Latham, 1994).

The Latham Report *Constructing the Team* was published in 1994, to much fanfare and tremendous soul-searching from all sides of the construction industry.[5] It also led to the creation of a myriad of implementation committees that must have consumed, in money, time and effort, a great deal of construction industry resources. While there is no doubt that the final report was a model of political elegance in drafting, because it offered something for virtually everybody in the industry, it can be argued that, at its heart, the basic message of the report was only partially valid. In the authors' opinion, the basic problem in the report lies in the belief that a more collaborative (win-win) approach to construction procurement and contracting, based around the creation of a team, is *the* way to

achieve improvements in value for money, quality and costs for UK industry and consumers.

This approach can of course only be appropriate for certain types of clients, contractors and sub-contractors in the industry under specific circumstances. The authors' view, which is developed in more detail in this volume, is that the Latham Report oversimplified both the problem of construction management and the resolution of its adversarial and conflictual nature. This was because those responsible for its intellectual foundations simply did not understand, or explain, the circumstances under which collaboration is, and is not, the most appropriate thing to do to achieve any specific form of improvement in construction procurement. Furthermore, and perhaps the most worrying feature of all, at no time does the report appear to ask the question: For whom is collaboration supposed to be a benefit? It is taken as self-evident that the building of a team will be in everyone's interest in the industry. The authors do not accept that this can be true under all circumstances, although they accept that, when it is appropriate it can be an extremely valuable method of achieving *effective leverage* over supply chain processes and resources.

This is the basic message of this book. It is that the Latham Report's main recommendations cannot provide the basis for a long-lasting improvement in the performance of UK construction industry on their own. There are many reasons for arriving at this conclusion, as will be demonstrated in this volume. The first reason, however, is because the report failed to undertake the root-and-branch analysis, from first principles, of the supply chains that make up what is sometimes generically called the UK construction industry. The second reason is that, if the report had done so, it would have concluded that what needs to be done within specific types of construction supply chains will always depend on the contingent circumstances that have to be managed. Collaboration may be appropriate in some of these circumstances, but it may not be others.

The reason for the report's faulty reasoning appears to be the fact that the methodology that was used was based on taking the learning from one type of supply chain and industry (primarily the automotive), and then to try to apply this logic to what are

completely different supply chains. This intellectual rationale appears to have been based on the somewhat spurious assumption that what is best practice in one supply chain can also be the basis for success in other supply chains. The more recent enthusiasm for agile manufacturing and lean thinking in construction is also from the same school of thinking. This we call best practice thinking, and we hope that this book will demonstrate why on its own it is a wholly inappropriate way of thinking about how to achieve significant improvement in construction procurement and contracting.

Since this book is devoted to guiding the reader through a new way of thinking appropriately about strategy and operational practice in construction, and because some of the ideas and concepts may be difficult to grasp immediately, it has been decided that the most practical structure is for the reader to be introduced to the argument in gradual stages. Bearing this in mind the book falls into four major sections.

In Section A, a general introduction and background to the problems facing the UK construction industry is outlined. This is introduced in three chapters. In chapter 1 the nature and structure of the UK industry and its current procurement practices is briefly outlined, with a summary of the major problems that militate against better value for money. In chapter 2 a comparison is made of the UK industry, with the Japanese and US industries, in order to ascertain whether the problems in the UK are unique or not, and whether there are major lessons to be learnt from the way in which the industry is organised in these very different countries and cultures. The evidence, it is argued, is inconclusive. In chapter 3, given that there is considerable evidence of disquiet, both within and without the UK industry, the major recent government-supported recommendations that have been proffered for improvement are briefly outlined. Here the major focus is on the Latham Report. An initial critique of the report is also developed at this stage.

Building on this initial critique, in Section B evidence is provided of better practices in construction procurement. Six major case studies, from very different cultures and contexts, are provided. These range from the Rover Group, McDonald's, BAA

and Gazeley Properties in the UK, to Shimizu in Japan and Company X in the USA.

Linking with these case studies, in Section C, a summary of some of the most important operational tools and techniques that have been used by practitioners is provided. It is clear from the research undertaken that operational tools and techniques which allow practitioners to major on risk management, supplier appraisal and development, standardisation and modularisation, and on strategic cost management are critical additions to the armoury of those wishing to develop a proactive approach to construction procurement. It is clear, however, that these tools and techniques can only be used under certain specific circumstances. Under different circumstances, it can be argued that these tools and techniques may simply not be the most appropriate to achieve business success.

In the final Section of the book these ideas are developed more comprehensively. The major problem that, in the authors' view, bedevils better practice thinking by construction practitioners is outlined. This is the conundrum that most practitioners never seem to resolve: it is the fact that observable empirical evidence of performance improvement by a large number of companies, using similar strategic and operational tools and techniques, can never be proof positive that this is what every one in construction ought to do to be successful.

This chapter explains why, even though there are clear similarities in the operating practices of the leading construction clients and companies that have been studied in our research, copying and adapting what these clients or companies are doing can never be the basis on which business success in construction should be based. On the contrary, it can be argued that these similar practices (that have been drawn from our case study material) could be the basis for business failure if they were slavishly implemented in an inappropriate context.

The key to business and construction success it is argued, therefore, is not about knowing what could be done, but knowing when it should be done. This quite succinctly provides the explanation of why this book is so critical of the underlying thinking behind the Latham Report. The major problem with the

Report is not that it tells the industry that a more collaborative approach can lead to performance improvement, but that it does not tell the industry when it is appropriate for this approach to be used and when it is not. Furthermore, in calling for a more collaborative approach, built on team working, the Report fails to provide an insight into the real business basis of long-term 'win-win' relationships. This, the authors maintain, is the structured hierarchy of dependency, control and leverage which is inherent in any long-term collaborative supply chain business relationships. By emphasising the concept of trust, it is argued, the Report fundamentally demonstrates its misunderstanding of how cost and quality improvements are actually achieved in supply chain relationships.

In the final chapter the authors' own views – based on the approach to strategy and operational practice presented in Andrew Cox's recent book: *Business Success* (Boston, UK: Earlsgate Press, 1997) – are briefly outlined. These views are focused specifically on how a more strategically and operationally aligned way of thinking about what is the appropriate thing to do to achieve the more effective procurement of specific activities, in the wide variety of supply chains that, collectively, constitute the construction industry. In this way of thinking, the wrong-headedness of best practice thinking is emphasised, and arguments are presented for an approach which is based on the need for practitioners to understand the contingent circumstances that face them. In a contingent world, it is argued, it is also essential that practitioners understand the full range of operational tools and techniques that are available to them.

By understanding both of these phenomena it becomes possible, it is argued, although not certain, that strategic and operational alignment can be achieved. For proper alignment to be achieved, however, it is necessary for a further phenomenon to come into play. This final factor is the clear specification by senior corporate decision-makers of their strategic vision for the company, within the context of the specific supply chains within which the company is operating. Without this, and an understanding both of the universe of possible tools and techniques available, and the unique properties of supply chains, it is, in the authors' view, almost

impossible for practitioners to know what it is that is appropriate for them to do at any moment in time.

It is our view that, if the Latham Report, and the somewhat naive research industry into automotive partnerships and lean and agile manufacturing processes that it has spawned, had devoted more time to analysing and understanding the properties of the unique supply chains which make up the complex reality of the UK construction industry, a greater service might have been done to value improvement in construction. It is, however, never too late and, if this book contributes to a debate that will allow practitioners and academics to focus on the concept of appropriateness in construction management, it will have served its purpose.

This book is not, however, the only contribution that the Centre for Strategic Procurement Management (CSPM) at Birmingham Business School has made to an understanding of better practice in construction. This volume should be read in conjunction with two companion volumes. The first is by Andrew Cox and Ian Thompson, entitled *Contracting for Business Success* (London: Thomas Telford, 1998) and the second, also by Andrew Cox and Ian Thompson, is entitled *The Contract Selection Toolkit* (Boston, UK: Earlsgate, 1998).

Notes

[1] Cox, A. (1997) *Business Success: A Way of Thinking About Strategy, Critical Supply Chain Assets and Operational Best Practice.* Boston, UK: Earlsgate Press.

[2] Ibid.

[3] Ibid.

[4] Ibid.

[5] Latham, M. (1994) *Constructing the Team: Final Report of the Government/Industry Review of Procurement and Contractual Arrangements in the UK Construction Industry*, London: HMSO.

Section A:

The UK Construction Industry in Context

Summary

In this Section, the major problems facing the UK construction industry, and effective procurement management within it, are outlined. At the same time the major recommendations that have been made by the government and the key actors in the industry are outlined and critiqued. The methods of construction procurement commonly used in Japan and the USA are also analysed, in order to address the issue of whether or not there are key practices that could be adopted that would quickly and readily improve UK ways of working.

The essential point that is made in this Section is that the simplistic copying, using benchmarking methodologies, of the practices of others, without a fundamental understanding of the context within which these practices are used, is unlikely to be the basis on which sustained improvement in construction procurement takes place in the UK. Furthermore, it is argued that recent government initiatives – particularly the Latham Report and related studies – suffer from an inappropriate methodology to analyse the causes of inefficiency in construction procurement. Having started from a faulty methodology, and having an apparent subjective preference for 'partnering' solutions, it is argued that the Latham Report cannot hope to resolve the major problems in the industry.

The Section concludes by beginning to address what a strategic approach to construction procurement management might look like. Such an approach, it is argued, must recognise that there are a range of tools and techniques available to the practitioner in

managing construction procurement, but that only some tools and techniques are appropriate under given circumstances. This way of thinking leads the authors to conclude that a segmentation approach that links particular construction sourcing options to specific contingent circumstances, is the basis of effective construction procurement practice. This leads to the conclusion that there can never be one best practice approach to the effective management of construction procurement, only a series of choices from which practitioners must choose wisely.

Chapter 1: The UK Construction Industry: What is the nature of the problem?

The Nature, Structure and Characteristics of the Industry

There is no doubt that construction is a key activity in any economy; it influences, and is influenced by, the gross domestic product (GDP) of that nation. The UK construction industry currently provides 5.4 % of the country's GDP[1], excluding materials and supplies from other industries. The total volume of all construction work in 1995 was valued at almost £13,000 million each quarter[2], with the total market divided almost equally between repair/maintenance and new work. Although it is fair to say that construction's share in net output has been in decline since the early 1970s, when its proportion of the GNP was at 6.6%,[3] the sector remains an important part of the UK economy.

Supply chains in construction are many and varied, encompassing a diverse range of skills and competencies. This point is illustrated by the Department of the Environment's comprehensive definition for the industry, which may be summarised as: *operations including building, civil engineering and specialist contracting, as well as other activities where the major element of work is building, civil engineering, or the installation of products and systems, either in buildings or in*

association with civil engineering works.[4] The actual definition goes further, giving examples of the wide range of activities involved in the construction process, from bricklaying to glazing. It is clear that the sheer number and diversity of trades and professions involved in the process often results in a series of supply chains that are both complex and difficult to co-ordinate.

The structure of the construction industry as a whole can be analysed in terms of demand and supply. On the demand side, the total market can be segmented in terms of the type of work required, including housing, industrial, infrastructure, commercial, and so on. Table 1.1 gives an indication of the relative sizes of each segment, by the value of work carried out for the years 1989 to 1993, while Figure 1.1 indicates the proportions of work in each of these markets in 1995. One current trend worthy of note is the gradually increasing share of activity in the repair and maintenance sectors. This may be largely explained by the economic influence of the recent recession; many clients for construction have reduced their capital investment in major construction works, opting to repair and maintain existing facilities instead.

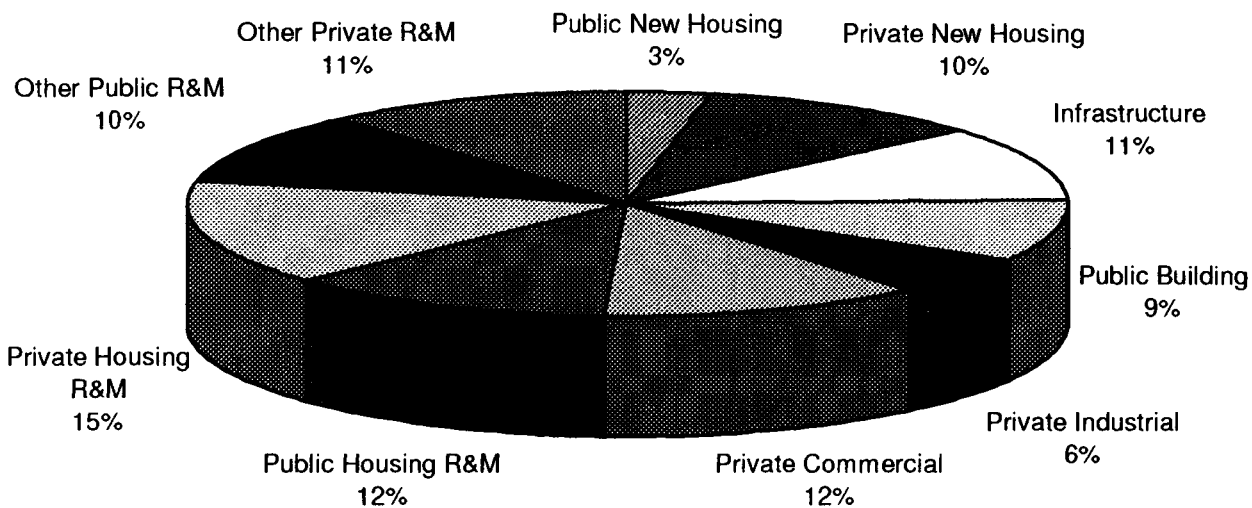
With the creation of the Construction Clients' Forum (CCF) and the Construction Round Table (CRT), the demand side of the industry has recently become less fragmented. The supply side of the UK industry continues, however, to be extremely fragmented, both in terms of the professions and the constructors. Builders, engineers, architects and surveyors are represented by a number of separate bodies, each looking after the interests of their respective members. These are predominately the Chartered Institute of Building (CIOB), the Institution of Civil Engineers (ICE), the Royal Institute of British Architects (RIBA) and the Royal Institution of Chartered Surveyors (RICS). Construction also requires input from other specialists, represented by the likes of the Chartered Institute of Building Services Engineers (CIBSE), the Institution of Mechanical Engineers (IMechE), and the Institution of Electrical Engineers (IEE). Consulting firms may also be represented by the Association of Consulting Engineers (ACE).

Table 1.1: All Agencies: Value of Construction Output By Type of Work.
(Current Prices (£M) - Great Britain)

Year	New Housing		Other New Work				All New Work	Repair and Maintenance				All R & M	£ Million
	Public	Private	Infrastucture	Other New Work excl. Infrastructure				Housing		Other Work			All Work
				Public	Private Industrial	Private Commercial		Public	Private	Public	Private		
1989	966	7117	4017	3903	3425	9892	29320	4943	8149	4982	4755	22830	52150
1990	934	5746	4965	4414	3394	11310	30762	5384	8455	5488	5218	24544	55307
1991	793	5003	6062	4142	2622	9103	27726	4938	8063	5291	5098	23389	51115
1992	1243	4841	5716	4181	2234	6600	24814	4991	7595	5087	4985	22658	47472
1993	1415	5213	5544	4045	2208	5131	23556	5439	7370	4916	5042	22767	46323

Source: Department of Environment (1995).[5]

Figure 1.1: Value of Construction Output by Type of Work, 1995 (current prices).



Source: Department of Environment (1996) [6]

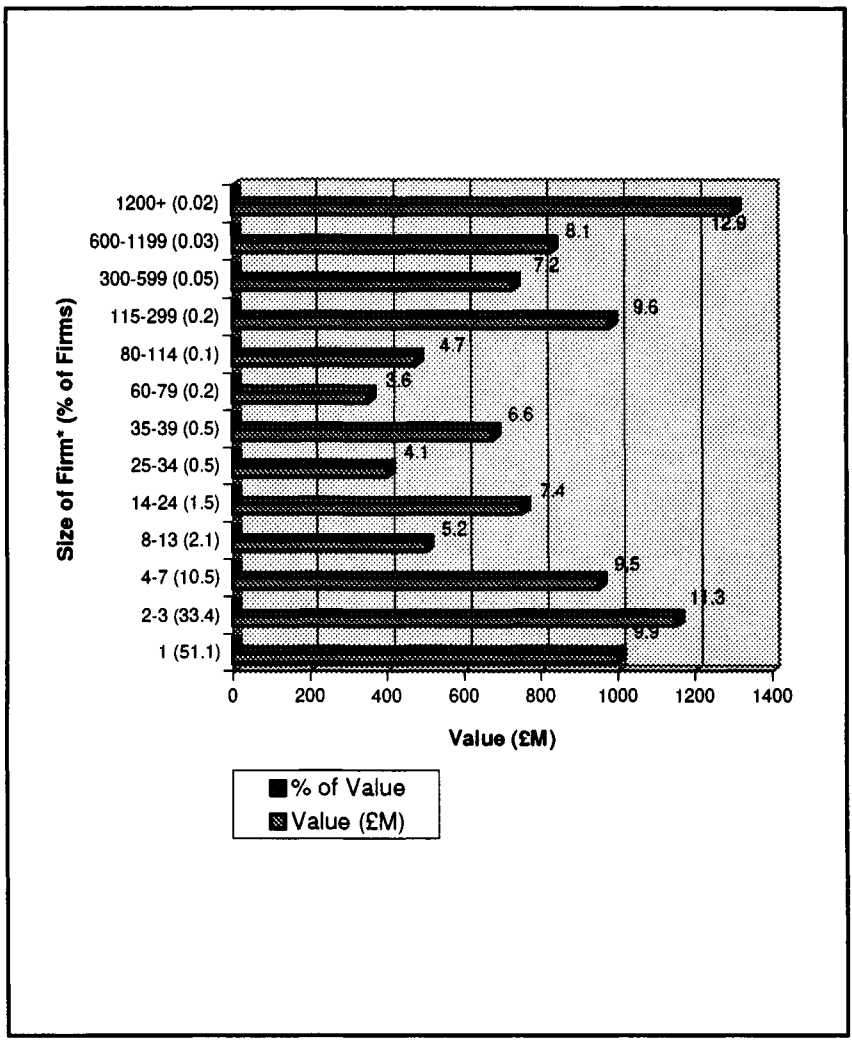
The contracting component of the supply side of the industry is no less fragmented. Although main contractors have representative bodies like the Federation of Civil Engineering Contractors and the Building Employers Confederation (BEC), there is a plethora of bodies looking after the interests of the specialist and separate trades contractors.

The industry is also polarised, with a small number of large firms picking up the major contracts at one end of the spectrum, and a vast number of small firms at the other end carrying out a substantial proportion of the total work load. Figure 1.2 highlights this situation. Over 50% of all firms carrying out construction work in the UK during 1995 were sole traders, generating a combined market share of almost 10%. The largest one per-cent of firms account for 28.2% of the total work load. Almost 95% of firms employ seven people or less, but still carry out over 30% of the total work.

Problems and Barriers to Value for Money

The existing literature, covering the field of construction economics, tends to agree that productivity, value for money, and overall client satisfaction in the construction industry are fairly low compared with other industrial sectors, and that no single, simple factor is responsible. There would appear to be a range of common factors, however, that could contribute to the inefficiencies in construction supply chains. The most commonly held views regarding the industry's problems may be categorised in terms of demand, supply and common issues. The main problems and barriers to achieving 'value for money' include: low and discontinuous demand; frequent changes in specification; inappropriate (contractor and consultant) selection criteria; inappropriate allocation of risk; poor quality; inefficient methods of construction; poor management; inadequate investment; an adversarial culture; and a fragmented industry structure.

Figure 1.2: Value of Work Done by Size of Firm*, 1995 (£M).



Source: Department of Environment (1996).[7]
* On the DoE's Register (number of people).

Demand Issues

Low and Discontinuous Demand

The Atkins Report[8] contended that construction's share of the GDP in the EC is too low and has been in long-term decline. The reasons for this were given as financing problems and declining public investment, exacerbated by the recent recession. The concern for this problem in the UK industry was echoed by Sir Michael Latham in his report *Constructing the Team*,[9] especially over the role of government as a major procurer of construction projects. We will explore the aims, recommendations and limitations of the Latham Report in a subsequent chapter.

The effects of low and cyclical demand for construction are described by Briscoe.[10] He has argued that when demand is low and falling, construction firms find it difficult to fully utilise their work force. Some workers will not, therefore, be fully active for all the hours for which they are paid, and while the firm attempts to adjust its labour requirement accordingly, the process of transition takes time. During this period, the firm will inevitably have a lower productivity ratio.

Perhaps what Briscoe does not add is the tendency of firms in this state to become more 'cut-throat' in their bid to obtain more work, and more adversarial in an attempt to recover costs through claims on existing contracts. Briscoe has also argued that when demand increases, firms will often prove slow in hiring new direct labour, and will attempt to meet their labour requirements through subcontracting. This is often seen as a problem in achieving the required quality of labour, and producing the continuity of expertise to bring about productivity increases. Further fragmentation results. The nature of client demand, therefore, appears to dictate the structure of the industry, which positions itself to meet that demand. Fundamentally, the demand side will require careful management, in order to avoid the induced fragmented industry structure, which in turn creates the adversarial culture. The authors feel that while the Latham Report recognised the effect of cyclical demand, it did not fully address the issue of the need for clients to manage their demand more

effectively. We will explore this fundamental point about the role of the 'intelligent client' more fully, later.

Frequent Changes in Specification

The Latham Report also contended that there are too many changes introduced when a scheme is already underway. This, it is argued, stems from an inadequate brief from the client to the consultant and/or contractor, which subsequently requires detailed changes in specifications as the client decides what he really wants. Changes then have serious implications for both cost and programme.

The NEDO Report *Faster Building for Commerce*[11] has explained how this problem arises. Many commercial clients have to operate in a fast moving and competitive environment, which often requires the need for flexibility to react to changing business requirements. In such cases, the procurement route needs to reflect this need.

Variations are more usually associated with projects where traditional procurement routes and forms of contract have been employed. Briscoe concluded that variations can provide a lucrative source of profit for the contractor and inevitably slow up the construction process. He also argued that they are often used to justify slow building, and are particularly prevalent on large public sector contracts.

Inappropriate Selection Criteria

"There is hardly anything in this world that some men cannot sell a little cheaper and make a little worse. Those who consider price only are this man's lawful prey"

John Ruskin, Sesame and Lillies (1865).

Wise words from Ruskin, yet it is only recently that construction clients, particularly those in the public sector, have truly opened their eyes to the fact that value for money will not necessarily be secured by competition for lowest bid price alone. Public accountability was often the reason given for awarding a contract to the contractor with the lowest tender bid price, with quality

seen as a 'given', covered by the specifications and contract. The Latham Report confirmed the prevalence of this approach, despite a letter in evidence to the review from Michael Howard, the then Secretary of State for the Environment, suggesting otherwise. Other public bodies have concurred that the former was often the case, as did the Federation of Civil Engineering Contractors in its discussion document *Competition, Quality and Value.*[12]

The Latham Report also considered the problem of achieving quality and value for money in the appointment of both professional consultants and contractors, and referred to a survey carried out by the ACE on its membership in 1994. The essential findings were that virtually all respondents were bidding low to maintain cash flow, and then having to provide a lower standard of service in terms of: consideration of design alternatives, design quality and a resistance to changes introduced by the client. The results in many cases were claims for additional fees, less trust between client and consultant, less investment in training and development and higher capital costs of construction and operation. The Latham Report also analysed the similar problems experienced in the appointment of contractors, and the multitude of costly and burdensome pre-qualification and tendering procedures.

Inappropriate Allocation of Risk

The Latham Report also recognised that no construction project is risk-free, and that risk may be managed, minimised, shared, transferred, or accepted – but, not ignored. The Report also analysed the various distributions of risk under the standard forms of contract and, in broad terms, how the client may assess it in advance. What was not addressed, however, is the issue of unfair allocation of risk. The FCEC argued that a client might make an unfair allocation of risk, in an attempt to reduce his own burden, either by imposing risks upon the contractor that are best carried by the client, or by not providing for proper reimbursement of risks carried by the contractor. This appears to be fuelled by a desire by some clients to get 'something for nothing', and can

only lead to disputes and the perpetuation of an adversarial culture.

Supply Issues

Poor Quality

WS Atkins' have argued that quality is one of the major problems in the EC construction industry, and that quality has two dimensions: the level of performance specifications/design merit and then the compliance with these requirements. Atkins have argued that there is a general belief that both aspects need to be improved in order to raise the quality of our built environment, reduce life-cycle costs, reduce the costs of defects and to enhance the image and investment potential for construction.

The Latham Report contended that poor quality in construction stems from the low barriers to entry in general contracting; a construction firm can be established with no qualifications or experience, and only a small amount of capital is necessary to commence operations. Although market forces eventually remove incompetent firms, in the interim they are a threat to responsible companies, bad for consumers and damaging to the quality and reputation of the industry. Although not directly included in our survey, many respondents stated that low barriers to entry caused a problem.

Inefficient Methods of Construction

Briscoe has argued that inefficiency occurs in the UK because industrialised building methods are much more widely used in other countries, while traditional methods, especially in the house-building sector, remain a preference in the UK. The Latham Report quoted evidence from large client organisations, such as Lynton plc, Stanhope and McDonalds Restaurants Ltd., stating that standardisation, prefabrication and modularisation techniques can bring about productivity improvements, with resultant cost savings in the order of 30–60%.

A NEDO report concluded that design has a significant influence on the efficiency of construction in two ways. Firstly the co-ordination of design activities affects the coherence of design

information; and, secondly, it will impact on the 'buildability' of a project. Essentially, the separation of design responsibilities and the lack of continuity in the development of design will eventually cause disruption on site. Many projects are also criticised for the lack of concern for the practical aspects of construction; designers appear to lose sight of buildability. These problems would seem to be symptomatic of the fragmented design responsibilities associated with the structure of the UK construction industry.

The Latham Report also tackled the issue of design integration, and recommended the formulation of a design check list to facilitate the co-ordination of the various design responsibilities. This may or may not work in practice, and its success is likely to be linked to the ability of the project manager concerned, but it does not really address the lack of process focus caused by the fragmented industry structure.

Poor Public Image

The construction industry has a poor reputation, with both its clients and the public at large. The Latham Report considered this problem and the industry's resultant lack of ability to attract and retain high calibre personnel in its firms. It also addressed the problem of equal opportunities in construction, especially concerning the employment of women.

WS Atkins has argued that to improve quality, productivity and value for money, the industry must attract and retain competent people. This is felt to be an increasing problem, as construction is often seen as poorly paid, dangerous, unhealthy, unpleasant, with poor job security and uncertain working hours.

The FCEC report also focused on the same problem in the civil engineering sector, and the lack of recognition of the industry's achievements. It argued that the negative public image is detrimental to political support, and that a raising of standards is required to effectively raise the barriers to entry.

The question arises as to whether the poor perception of the industry is another symptom of its fragmented and adversarial structure.

Common Issues

Poor Management

Briscoe has recognised that, while many other factors contribute to low productivity, some firms are able to achieve a greater output per man than others. This, he contends, is due to the quality of construction management across the firm: from director/senior management down to project manager/site agent level. Good management at a senior level will lead a firm to organise its structure and systems in the achievement of higher productivity. At site level, good management will ensure that materials are promptly delivered to site, that sub-contractors are scheduled properly, their performance is closely monitored, their direct labour is suitably motivated, and so on. Briscoe has argued, correctly in our view, that such quality in the construction industry is highly variable.

The NEDO report also considered the relationship between success on site and 'strong' management teams. It underlined the need for customers to be able to appraise their tenders with respect to the quality and calibre of site management they are buying for their projects, and to be wary of 'lean resourcing'.

A successful project, however, does not just depend on the effective management of the supply side. The client also needs to take some responsibility. The FCEC report stated that the contracting side of the industry complains that the client, (and his employees, and professional advisors) do not appear to have the necessary understanding of the industry. As a result they tend to employ procurement methods, often inherited from others, without an appreciation of their effects on the construction process. Excess expenditure may be incurred by some clients as a result of these inappropriate procurement practices.

The implication here is that the client needs to be just as proactive in his project management, as his contractors and professionals; he cannot totally devolve responsibility.

Inadequate Investment

Both Latham and WS Atkins have considered the problems associated with inadequate investment in training, research and

development and the impact on quality in the industry. Atkins has argued that the levels of skills on construction sites has declined in recent years, partly due to the availability of cheap, unskilled, immigrant and temporary labour, which has created a disincentive to invest in training and skilled labour. The report states that improvement in training in most EC countries is required.

Regarding research and development, Latham quoted evidence from a Construction Industry Council (CIC) working party discussion document,[13] which expresses the view that 'UK spending on construction research and its dissemination is substantially below that judged necessary by a succession of authoritative studies'. The Report further considered views on the fragmented approach, the lack of co-ordination, and the barriers to effective dissemination and realisation of tangible benefits.

Atkins explained that investment is low in the EC, compared with the likes of Japan, partly as a result of the structural characteristics of the industry, with many small firms, volatile markets creating short term attitudes, low profitability because of cut-throat competition and fragmented industry interest groups.

Again, the inference is that the industry structure dictates the attitudes of its participants, which leads to the symptomatic problems described.

Adversarial Culture

The adversarial nature of the UK construction industry has been a recognised problem for many years. The Chartered Institute of Purchasing and Supply (CIPS), in its submission to the Latham Review,[14] stated that present adversarial practices were to the disadvantage of clients and discouraged the adoption of the best modern procurement processes, which would achieve better value for money and enhanced product quality. Avoidable disputes, and the events that lead up to them, divert management attention from constructive work, and therefore reduce productivity and increase costs.

The CIPS have argued that this problem is prevalent at all levels in construction supply chains, and that the primary causes of the problem are: the lack of a clear contract strategy;

inadequate planning; improper assessment and appropriate allocation of risk; communication problems throughout the supply chain; insufficient pre-planning; inadequate selection and adjudication of tenderers; traditional forms of contract creating the potential for conflict; a vicious circle of 'claimsmanship'; industry structure; and payment problems. The causes of adversarialism in construction are deep-rooted in both UK commercial culture and the construction industry structure and process.

In short, it would seem that the problems described are an integral part of the industry culture, which itself continually reinforces the attitudes to those problems, and further perpetuates the adversarial culture. The vicious circle continues.

Fragmented Industry Structure

The CIPS submission to the Latham Review summarised the nature of the fragmented industry structure.[15] It contended that various recessions since the Second World War have forced contractors to end their historic practices of 'vertical integration'. Consequently, they have shed craftsmen, so that many 'main contractors' no longer undertake work directly. This has led to the greater use of labour only sub-contracting, buying-in of materials and hiring of plant. Indeed, some sections of work may be sub-contracted wholesale. Labour only sub-contractors engage workers for specific contracts, with little or no training. Sub-contractors may also further sub-contract sections of their work. It is interesting to note, however, that this trend appears to be reversing more recently.

Faster Building for Commerce,[16] also analysed the problem of industry structure, and argued that the proliferation of organisations and specialisms has aggravated the existing problems of co-ordination, communication, motivation and control. The industry is, it is argued, not only fragmented in terms of the number and size of construction firms, but also the diversity of professions and trades. A plethora of associations and other representative bodies have been established to look after the interests of their individual members.

Over a period of time the construction supply chain has evidently become increasingly fragmented, as each component has become less trusting, more self-interested and adversarial. Effectively, each party attempts to pass risks down to the next layer in the supply chain in order to minimise their own exposure.

This behaviour is evident through the imposition of often onerous clauses by some clients in their amended conditions of contract. Primary contractors perceive this as unreasonable, yet pass on the same responsibilities to their sub-contractors. Little consideration is given to assessing which party is best qualified to manage the risks concerned.[17,18]

The net result, it is argued, is an industry structure with many interfaces, points of tension and conflict, which ultimately leads to increased cost and reduced efficiency. This scenario is represented diagramatically in Figure 1.3. Each party has its own particular needs and interests, which are not necessarily compatible with those of the other actors in the construction process. Clearly there are a number of distinct disciplines required to complete a construction project, but the manner in which these are co-ordinated and integrated will affect the efficiency and effectiveness of the construction process. This point is recognised in the recent report *Value for Money*.[19]

It is generally accepted, therefore, that the structures of traditional construction supply chains are fragmented and dysfunctional, with too many 'non value-adding' costs.[20] The question arises, however, as to what drives this industry structure? While there are many factors involved, the primary force would appear to be the effects of client procurement behaviour.[21] So, what is the nature of the traditional procurement options available to clients, and what are their inherent limitations?

Traditional Approaches to Construction Procurement

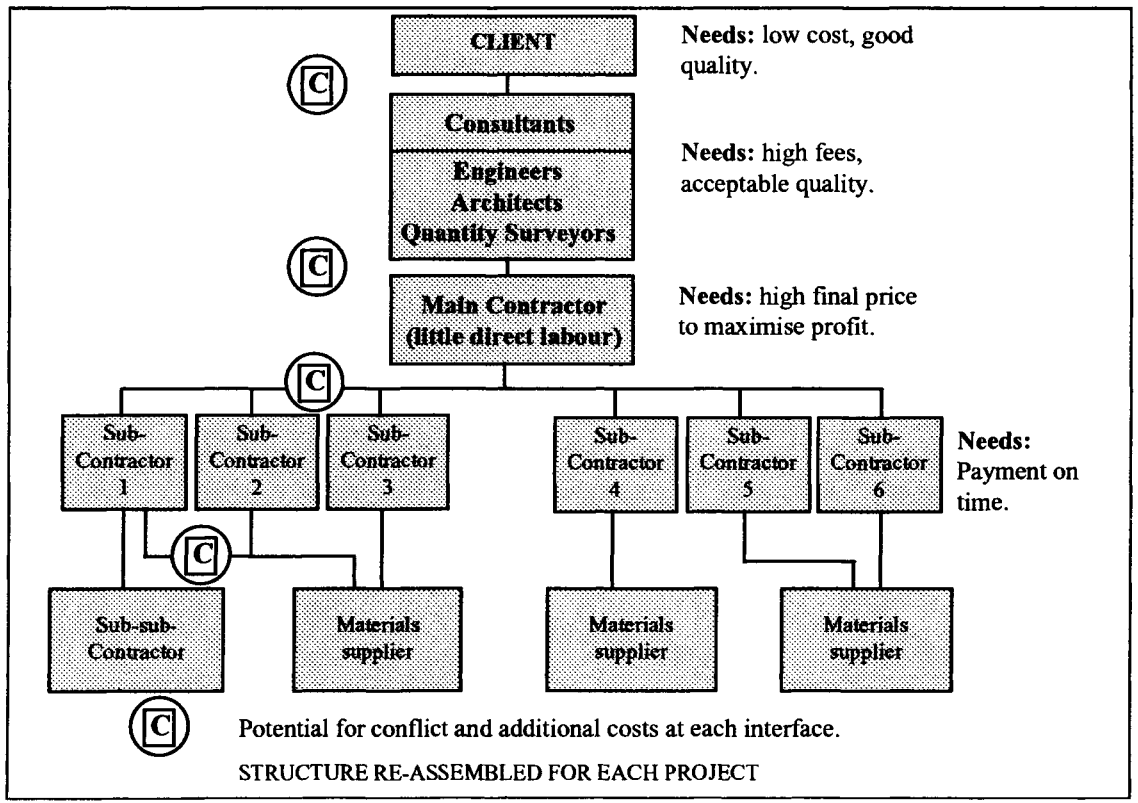
The evolution of procurement in construction could almost be plotted on a date line, starting with traditional tendering at one end, through to 'partnering' at the other. In between one may

include two-stage tendering, design-build, management contracting and construction management. Rougvie has argued that each new form of procurement has essentially been developed in response to practical limitations that appeared in practice in previously popular methods.[22] The emergence of a 'new' approach is often heralded, therefore, as a panacea for all previous problems. At first, there may be a number of notable successes, as the latest system is used under conditions for which it was originally intended. Then, as word of its success gains momentum, the new approach may be used less and less appropriately. It then becomes a matter of time before it becomes discredited and there are calls for yet another new approach. For instance, both 'design and build'[23] and 'construction management'[24] have recently suffered this fate, while 'partnering' appears to be the latest fad to emerge as *the* way forward.[25] Perhaps, here we see parallels with the development of fads in business, such as 'JIT' and 'TQM'.

The development of procurement practices in this fashion may be described as 'barefoot empiricism'.[26] Essentially, there has been no theoretical framework on which to derive either an ideal or an optimum approach to procurement, only a reactive evolution of modus operandi. Any system will clearly have inherent strengths, weaknesses, and attributes that will render it ideal for a given set of circumstances. The problem is that the client, in choosing amongst the conventional options, is always aiming for 'best fit' against its own specific criteria. This effectively means selecting an 'off the peg' suit in a world where the customers' requirements and specifications are immensely complex.

Ideally, construction clients require contingent procurement strategies which take on board all relevant factors, and lead to consistently predictable outcomes. This is the approach promoted by this book, and is explored in subsequent chapters. In this chapter the characteristics and limitations of current approaches to construction procurement in the UK are considered.

Figure 1.3: Existing Industry Structure.



UK Procurement Options

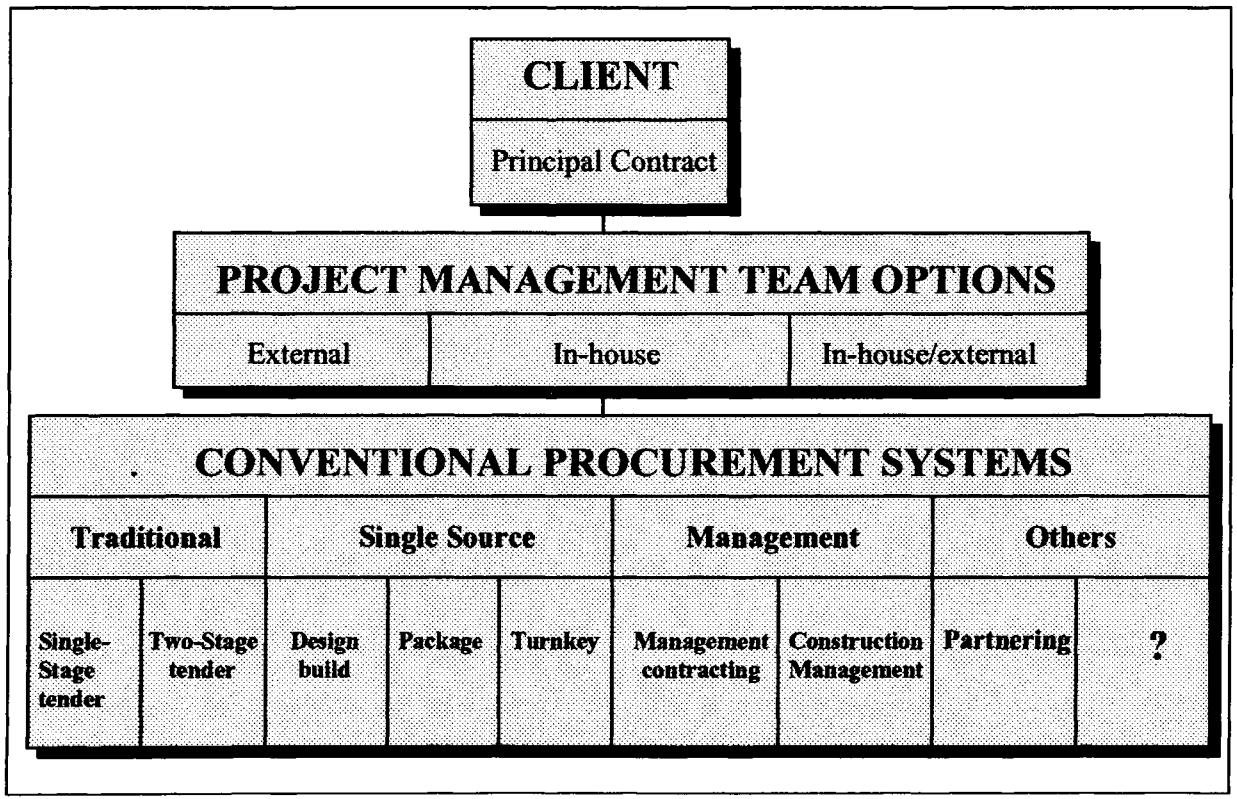
There is a bank of literature covering current approaches to construction procurement, which describes the characteristics of each one, and gives guidance as to the approximate circumstances under which each methodology should be used. There does not, however, appear to be a consistent approach to codifying the different approach and their derivatives. The most common classifications include: traditional; single-source; management methods; and others. Figure 1.4 provides a model for classifying the options available to clients. Each one of these is described in detail in the remainder of this chapter.

Traditional Tendering

By the end of the eighteenth century the role of the architect as an independent designer of buildings was firmly established. At the beginning of the following century the 'general contractor' emerged in, more or less, its present form. These two parties, together with the embryonic quantity surveyor, shaped a common format for contractors to price building proposals in competition. The theory being that the contractor's price, given as a lump-sum in a bill of quantities, should give an accurate representation of the cost of work to be completed. From this model developed the process upon which the current standard forms of building contracts are based.[27]

The system of traditional tendering is based on the rigid separation of the design and construction activities. The client appoints a team of consultants, usually following the feasibility study, in order to develop the detailed design. The design team prepares all drawings, specifications and bills of quantities, before the process of tendering for the selection of a suitable contractor takes place. The two main mechanisms for tendering are 'single-stage' or the accelerated 'two-stage' system.[28] Contract award is usually on the basis of lowest bid-price, although some of the more enlightened clients are now starting to consider a range of criteria, weighted in accordance with the potential impact on successful project outcome. The appointed contractor is responsible for the execution of all construction works, which

Figure 1.4: Conventional Procurement Options.



may be undertaken using a combination of sub-contractors and direct labour.

Single-Stage Tender

The normal practice followed for single-stage tendering is that the architect, engineer, quantity surveyor and other specialist consultants each enter into separate contracts with the client. The design team then prepares the complete specification, drawings and bills of quantities. The tender documents are sent to a suitable number of competing contractors, who must price all items of work identified by the design team.

Traditional single-stage tendering is not suitable for use on most large and complex projects, unless there is special provision for management skills and a structure to co-ordinate the large range of specialist designers on such projects.

Two-Stage Tender

The system of two-stage tendering was developed during the 1960s to overcome some of the limitations inherent in the single-stage approach, mainly the problems that arise from the total separation of the design and construction processes.[29] This is achieved by introducing a higher level of integration and exposing the design team to the management discipline of the contractor.

The design team establishes a notional bill of quantities when the design has reached a suitable stage of completion. Selected main contractors are then asked to tender rates against the approximate quantities contained in the bill, and may be requested to submit their proposals for the management of the construction operation, and any suggested design changes/improvements. The successful contractor then becomes a full member of the project team, and is able to advise on any aspect of the scheme, which may be improved in terms of speed and/or economy. A full bill of quantities may be prepared when the design is fully developed, with rates transferred directly form the notional bill, or negotiated if there are substantial differences to be considered.

The two-stage system is best applied to large/complex projects, where the design solution may not be derived without specialist construction input. It may also be used if it is necessary to accelerate the construction programme.

There are, of course, other variations on the traditional approach, including continuity contracts. These were developed in primarily to reduce transaction costs. There are basically three forms of continuity contract:

- ***ad-hoc***, where there is a negotiation of rates for a second project based on those from the first;

- ***term***, where the contractor is appointed for a fixed period of time (often between twelve months and two years) and is reimbursed in accordance with a comprehensive master schedule of rates;

- ***serial***, where a client effectively batches a series of similar projects together, in order to introduce greater economies of scale and save time by avoiding repeated tendering.

Single Source Systems

There is a group of procurement systems that enables clients to employ one firm to take responsibility for the complete delivery of its construction needs. There are a number of variations within this category, notably 'design and build', 'design-build', 'package deals', and 'turnkey'. In recent times a host of other variants has also emerged, including 'build-operate-transfer', 'design-build-finance-operate', and so on. These are effectively similar in concept; the difference is in the balance of responsibilities between client and contractor.

Design and Build

As its name would imply, this system simply means that the contractor offers to undertake the entire design and building of a project for the client. Although the contractor assumes the overall responsibility for project delivery, the client may appoint an

independent advisor to monitor quality and cost. There is nothing particularly new about this concept; prior to the nineteenth century it was common for architects or master craftsmen to offer this complete service.[30] This approach has also been widely employed in other countries for many years, including Japan and the United States. It was not until the 1970s, however, that contractor's design and build appeared in the UK civil engineering sector.[31]

The Construction Round Table report *Thinking about Building* considered three variants on the design and build theme: [32]

- **direct**, where the designer/contractor is appointed after an appraisal, but no price competition;

- **competitive**, where there is price and design proposal competition between several contractors, on the basis of a conceptual design prepared by a consultant; and

- **develop and construct**, where the design is partially completed by the employer's designers, before contractors are asked to complete and guarantee the design in a competitive tender.

Rougvie has argued that either competition or negotiation methods may be used in the selection of a design and build firm, depending on the amount of up-front information. There also obviously needs to be sufficient detail to allow a meaningful competition.[33] Clients may also need professional advice to prepare the brief, and monitor progress during the project.

Bennett *et al.* have argued that the most important factors affecting the client's choice of a design-build approach are: single-point responsibility; the need for guaranteed maximum price; and the avoidance of design and construction risks.[34] They further maintain that this system of procurement is best used for the construction of office buildings, distribution warehouses, standard manufacturing facilities, residential and 'out of town' retail parks.

Management Systems

A variety of management systems were introduced into the UK during the late 1960s, and were widely used in the building, process and off-shore industries, although less so in civil engineering. These management approaches were developed in response to the limitations of traditional systems on increasingly complex projects. The common feature is that a client enters into a contract with an external management organisation, which is responsible for the management and co-ordination of design and construction of the proposed works. There are several variations on this theme, including: management contracting; construction management; design and management; and project and management services.[35] The most commonly used are management contracting and construction management.

Management Contracting

The management contractor does not normally undertake any of the permanent construction works, but provides management services to control and co-ordinate all site activities, sub-letting the actual works to suitable contractors on a competitive basis. Management contracting services may be utilised pre-construction and/or post-contract award.[36] The mechanism for payment is usually on a cost-reimbursable basis, plus a management fee (usually a percentage of the prime cost), resulting in low risks to the contractor. The balance of risk may be re-distributed by the use of target costs, with appropriate risk/reward incentives.

The first pure management contract in the UK is believed to have been undertaken by Bovis in 1972, although the approach had commonly been in use in the United States since the 1940s. It should be noted that there is some inconsistency in the use of terminology when describing this approach; in America it is described as 'construction management', and should not to be confused with the UK professional management discipline of the same name.[37]

The CIRIA Report on *Management Contracting*[38] gives guidance as to the best conditions for employing this approach: on large/complex projects, where there is a greater requirement for

flexibility on design changes than conventional systems will allow; the need for an early start during the construction phase; a need for early completion, but where the design is insufficiently developed; a need to consider particular construction methods during the design phase; where the client and designers have insufficient management resources; where a large number of different contractors are required, resulting in many interfaces for co-ordination.

Construction Management

Construction Management (CM) primarily evolved in response to a major shortcoming in the system of management contracting. Adversarial attitudes had re-emerged on some contracts, due to client tendencies towards assigning increasing levels of risk to management contractors, which they could neither manage or reasonably price. This led to the management contractors effectively being responsible for the default of works contractors, without having the authority or flexibility to manage the whole design and construction process.

Using CM the client enters into separate contracts with a designer, a construction manager and works contractors.[39] Developed in the United States, this approach allows clients to build quickly and play a part in the total process, but carries the risk of cost planning without a fixed lump-sum price. CM was introduced to the UK during the late 1960s, and differs from the American version in several ways:[40]

- The UK system demands a great deal of client commitment in the process, as the client directly employs the works contractors.

- The CM acts purely as the client's agent, theoretically impartial in co-ordinating and controlling the project.

- A 'team-working' approach is characterised by the construction manager leading the design team, which may involve several other consultants, as well as the client.

This approach appears similar to management contracting at first-sight, but the latter does not give the management contractor the opportunity to manage the project with status equal to the design consultant, nor to act as a contractor with the usual contractual risks. Construction Management recognises the role of management as an explicit professional function, separate from contracting.

Construction management is best used when the client wishes to have: separate contractual responsibilities for the professional management and the design of a construction project; flexibility to use competitive tendering and/or negotiation for procuring separate elements of construction; an early start on site, which is particularly desirable during periods of rising inflation; a fast-track project; a less adversarial form of contract; and scope for variations throughout the project.[41]

New Directions: Partnering

Partnering is currently held by many to be the way forward in construction. There is a belief that this form of procurement, more than any other, will deliver 'win-win' solutions for the whole construction team. This concept has become the pre-eminent subject within the industry over the last decade. Judging by the amount of coverage in the technical press, and the number of publications, guides, conferences and workshops on the subject, one could almost be forgiven for thinking that the cure for all of the industry's ills has been found. Some advocates of partnering have adopted an almost religious fervour for the concept. They appear to hold the view that basically all people are trustworthy, want to do things which are valued, and would wish to work in a collaborative 'win-win' environment.

The Partnering approach appears to validate this optimistic perspective on human nature and motivation. There are, however, sceptics who hold a contrary view; that human beings seek to avoid responsibility and must be coerced to perform using a strict contract, applied in an arms-length manner. In this view any form of collaboration is not only impossible to achieve but an inappropriate way of doing business. Parallels can be drawn here

between McGregor's *Theory Y* (positive) and *Theory X* (negative) views of human nature.[42]

The reported benefits of partnering appear to be many, and include: reduced costs; increased profits; reduced lead-times; improved quality; less confrontation/claims; better utilisation of resources; innovation; and greater levels of investment. Although much of the evidence is anecdotal, the Reading Construction Forum Report claims that savings of between 2 and 10% are possible with project partnering, while savings of 30% or more are common using strategic partnering.[43]

With all the hype concerning the benefits of adopting a partnering approach there is, however, evidence that the profession is confused as to what partnering actually means in practice. In the remainder of this chapter the issue of whether or not partnering offers *the* way forward is discussed.

The Emergence of a New Approach?

As the National Economic Development Council describes, 'Partnering appears to have *evolved*, rather than begun life as the realisation of a specific idea.'[44] Larson suggests that partnering emerged in response to the general decline in the North American construction industry, evident by the gradual erosion of profit margins, poor quality work, increased overheads, an increasing reliance on litigation to resolve disputes, and a deterioration of competitive advantage overseas.[45] A better way of working was required; adversarial practices were clearly destructive and inefficient. More generally, partnering had been used as a contracting strategy by US manufacturing and distribution companies since the early 1980s. This has taken the form of strategic alliances and long-term, highly structured and co-operative relationships between companies to achieve separate, but complementary objectives.[46]

Although the terminology appears to have emerged in the United States, it essentially borrows from the Japanese way of working – the 'keiretsu' structure. The term 'partnering' would receive little recognition in Japan, however, as their long-term relationships characterised by common goals and trust are an

inherent part of the culture; it is the Japanese way of doing business.[47] There are a number of other factors which have supported the development of this approach in Japan, including: central planning/government support; a long-term view on investment; and most importantly, regular high spending clients in a healthy and growing economy.[48]

There is now evidence, however, that many of these close relationships are coming under increasing strain.[49] Quite simply, since the end of the bubble economy in the early 1990s, Japanese companies have experienced increasing competitive pressure in their own markets, which has resulted in a reduced demand for construction. Where investment does take place, clients are forced to look for ways to reduce their costs. As a consequence, regularity of work is no longer guaranteed, and many of the major contractors are advising their long-term sub-contractors to seek work elsewhere.

Public clients are also affected. The performance of the economy has put greater pressure on public spending and the need for greater value for money. This factor, combined with the signing of the World Trade Organisation agreement, has led to the introduction of more open tendering for public works.[50] With this increasingly competitive environment, it is entirely possible that a slow process of fragmentation in Japanese supply chains is occurring. Having understood its origins, what does 'partnering' actually mean in practice?

What is Partnering?

Quite succinctly, partnering appears to be a confused concept, meaning different things to different people.[51] To some it means a close single-sourced relationship, while to others it means effective project management.[52] There are a number of definitions for partnering, many of which seem to be derived from similar sources. The primary definition for partnering in construction appears to have been developed by the Construction Industry Institute's Partnering Task Force. Partnering is defined as:

> *'a long-term commitment between two or more organisations for the purpose of achieving specific business objectives by maximising the effectiveness of each participants resources. The relationship is based on trust, dedication to common goals, and an understanding of each other's individual expectations and values'.*
>
> Construction Industry Institute[53]

Others appear to have accepted this as a good working definition, and have used it as a foundation to build upon. The NEDC Report quotes this terminology, and considers further that the arrangement between a client and its chosen contractor is more likely to have a duration measured in years, rather than a single project.[54] The most recent definition was developed by the Construction Industry Board (Working Group 12),[55] which builds on the thoughts and views of the Latham Report.[56] The CIB Report appears to borrow heavily from the work of the Reading Construction Forum, using its definition as a starting point. The CIB states further that *'Partnering is a structured management approach to facilitate teamworking across contractual boundaries.... It should not be confused with other good project management practice, or with long-standing relationships, negotiated contracts, or preferred supplier arrangements, all of which lack the structure and objective measures that must support a partnering relationship.'* The inference here is that partnering can occur irrespective of the type of supply relationship involved.

When analysing the literature, it becomes clear that there are a number of key attributes associated with partnering. These are summarised in Table 1.2 There appears to be almost universal agreement concerning a number of these traits, including the need for: mutual objectives; an agreed method for early problem resolution; continuous measurable improvement; and for commitment from management and stakeholders.

Table 1.2: The Key Attributes of Partnering

	PRIMARY SOURCES						
KEY ATTRIBUTES	CII (1991)	NEDC (1991)	Partnership Sourcing (1994)	Baden-Hellard (1995)	Bennett & Jayes (1995)	CIB (1997)	ECI (1997)
Mutual objectives (risks and rewards)	●	●	●	●	●	●	
Agreed method for early problem resolution		●	●	●	●	●	●
Continuous measurable improvement	●	●	●	●	●	●	●
Equality in relationships (win-win)	●	●		●	●		●
Open (no blame) culture		●	●		●		●
Customer focus					●		
Management & stakeholder commitment	●		●	●	●	●	●
Trust	●	●	●	●	?		●
Long-term commitment/ emphasis	●	●	●				
Innovation		●					
Team approach					?	●	

It appears that some attributes, however, are more contentious. For instance, some of the earlier literature highlights the need for long-term commitment, particularly Construction Industry Institute (CII),[57] NEDC[58] and Partnership Sourcing.[59] The more recent material appears to move away from the need for established relationships, and maintains that the collaborative benefits of a partnering approach are possible for a specific project. In fact Baden-Hellard contends that the use of this form of partnering is necessary to the exclusion of the strategic variety, as a necessary result of construction's 'one-off' approach to programme management.[60] The project partnering route is also believed to be particularly well suited to public sector procurement, with its many constraints such as the need to demonstrate value for money and public accountability.[61] Many recognise the point, however, that strategic alliances are more likely to realise greater benefits than single project partnering arrangements.[62]

There is one further significant point of debate, the need for equality or 'win-win' also appears to be an important characteristic in partnering. When one considers the nature of supply relationships, however, it is very difficult to imagine how this might be so in practice. Can there ever be equality in a buyer–supplier arrangement? This fundamental point is discussed in more detail later.

The literature also reveals that partnering is not a unified concept. It takes on a number of different forms, including: project partnering; post award project partnering; semi-project partnering; pre-selection arrangement; co-ordination arrangement; and strategic/full partnering. The main differentiating features between these appear to relate to relationship duration, the basis of selection and the most appropriate conditions for application. Table 1.3 summarises this information.

It would seem that the reason for the existence of different types of 'partnering' is that different levels of collaboration are possible, depending on the type of supply relationship concerned. This in turn depends on the contingent circumstances faced by the organisations in a specific supply chain. This means that any organisation wishing to 'partner' must first address the issue of

Table 1.3: Different Forms of Partnering

		Differentiating Features		
Forms of Partnering	**Sources**	**Relationship Duration**	**Basis of Partner Selection**	**Conditions for Use**
Project	Bennett & Jayes Baden-Hellard CIB	One-off	Competition/ negotiation	All projects. Best for high value/high risk
Strategic/Full	Bennett & Jayes NEDC CIB	Long-term	Competition/ negotiation	Where good business case, part of medium-long term strategy
Post-award	ECI	One-off	Competition	Public projects, including series of small projects.
Pre-selection arrangement	NEDC	One-off/ long term	Negotiation	Any project. Advance selection of contractor(s)
Co-ordination agreement	NEDC	One-off/ long term	Competition/ negotiation	Any project. Agreement overlaid on standard contract.
Semi-project	Matthews, Tyler and Thorpe	One-off	Limited competition	All projects where scope for negotiation is limited

what type of relationship it requires, before electing to follow any particular form of partnering.

The fact that there are different forms of supply relationship in construction appears to have been recognised by a number of authors. Ellison and Miller suggest that there are four models of relationship: adversarial leverage; collaborative team-oriented; value-added integrated team; and synergistic strategic partnership.[63] Similarly, Larson describes a range of relationships from adversarial, guarded adversarial, informal partners to project partners.[64] He argues that adversarial relationships are characterised by each party pursuing its own concerns. Guarded adversarial allows co-operation within the boundaries of the contract. Informal partners attempt to sustain a co-operative relationship beyond contractual boundaries. Project partnering involves participants as equals with common goals and objectives. These imply different levels of integration between client and contractor, although the focus is still on the one-off relationship.

When should Partnering be Used?

Although the CIB recognises that partnering is not appropriate for all situations, it believes that the approach succeeds best for the procurement of high value/high risk construction requirements, and where the account is considered attractive by the contractor.[65] This alludes to the need for a coincidence of interest between buyer and supplier. The opinion is expressed, however, that a 'partnering' approach can be applied with any procurement approach/contract. Can it really be applied to an arms-length contracting situation?

If the CIB view is adopted, partnering can occur irrespective of the type of supply relationship experienced. The guidance on how to use partnering seems to ignore the issue of the relationship between client and contractor, contractor and sub-contractor, or client and consultant. It is perhaps assumed that this is an irrelevant factor in the process of procurement. If it does not describe the type of supply relationship, then what does partnering offer? It would seem to present little more than a desirable spirit

of co-operative teamworking; a procedure for making relationships work better. Several key questions arise:

- one of the critical success factors is considered to be commitment from all partners at all levels.[66] What brings about this commitment in a supply relationship?
- is it realistic to consider that collaborative approaches are possible under all circumstances?
- is it possible to ignore the nature of supply relationships?
- or, are there certain factors associated with relationship types which underpin the successful use of collaboration and certain features which do not?

In this volume the key line of argument is that collaborative approaches can only be possible where there is a relationship based on regular spending, and where there is a coincidence of interest between buyer and supplier. Where else is the incentive to collaborate to come from? The key point is to understand the nature of power and motivation in supply relationships.

The Nature of Supply Relationships

As A. T. Kearney concluded in its survey of UK partnering practices, companies that ignore the realities of their commercial situation and assume that a partnering approach is universally applicable face ultimate disappointment.[67] This report found a number of factors which militate against the successful application of partnering approaches in supply relationships, including:

- buyer and supplier objectives in critical areas will almost always be in conflict;

- co-operation endures only as long as there is mutual competitive advantage; and

- success depends on consistency of behaviour throughout the organisation(s).

It was concluded that organisations need to understand the influence of power in supply relationships. The reason for this is that it is extremely unlikely that there can ever be absolute equality in any supply relationship. Most trading relationships, whether they incorporate partnering approaches or not, are driven by the relative power of the parties involved.[68] An understanding of the nature of power, who has it, how to get it, and how to use it in a constructive way is critical to successful supply chain integration.

It is, therefore, reasonable to conclude that partnering, or collaborative ways of working as the concept appears to mean, may not be appropriate for all situations. As has already been stated, there is a need to establish what relationship type is required for a given situation. It is then a case of understanding how the relationship should be managed to deliver the intended benefits. This means thinking through what is appropriate and fit-for-purpose.[69]

Limitations of Current Procurement Approaches

All of the current procurement systems described above, with the exception of 'strategic partnering', are essentially variations on a theme; they assume that each project is procured on an individual basis. They only differ in their apportionment of authority, responsibilities and risk. The vast majority of construction work currently undertaken is normally procured in a 'one-off' manner, with each party trying to extract maximum reward for minimum risk. Little thought is currently given to which forms of supply relationship are most appropriate through the supply chain, in order to best satisfy a client's construction needs.

The old argument that every project is unique and should, therefore, be procured as a separate contract, would appear to be the reason for this penchant for arms-length, one-off relationships. In approaching construction in this traditional bespoke manner, both the demand and supply sides of the industry, it has been argued, are effectively foregoing the opportunity for continuous improvement, in terms of cost and time reduction and

enhancements in quality and safety. This has provided the background against which advocates of long-term collaborative partnerships have been able to claim that there is a superior best practice. Partnering enthusiasts have argued that the parties involved in the process cannot improve productivity and performance, when they are continually forced to start at the bottom of the 'learning curve' on a project-by-project basis. They point to the fact that nothing other than opportunistic behaviour can result from an adversarial relationship built on the need for short-term gain.

Clients and their advisers using the traditional approaches to procurement, effectively apply a sourcing strategy that, it is argued, can be described as 'adversarial leverage'. Such arms-length supply relationships, it is argued, is normally only suited to non-strategic, low-value, and infrequent purchases, where there is a great deal of choice from a market of expert and capable suppliers (i.e. a 'commodity spend'). Proponents of partnering, therefore, argue that leverage sourcing is currently applied to all segments of construction, regardless of the type of spend and supply market characteristics, and without any thought to the potential benefits that could be gained through the application of a more strategic partnering approach. But are they correct that this more collaborative approach is the best way of managing construction procurement? One way to address this issue is to ascertain whether clients and practitioners are pursuing more collaborative and less adversarial approaches in other countries. If they are then, presumably, the case for partnerships will be confirmed. As we shall see the evidence is far from conclusive about the primacy of partnering when we analyse construction procurement practices in Japan and the USA.

Notes

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[3] *Ibid.*
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[30] Ibid.

[31] Potts, K. F. (1995) *op. cit.*

[32] Construction Round Table (1995) *Thinking about Building*, London: Business Round Table Ltd.

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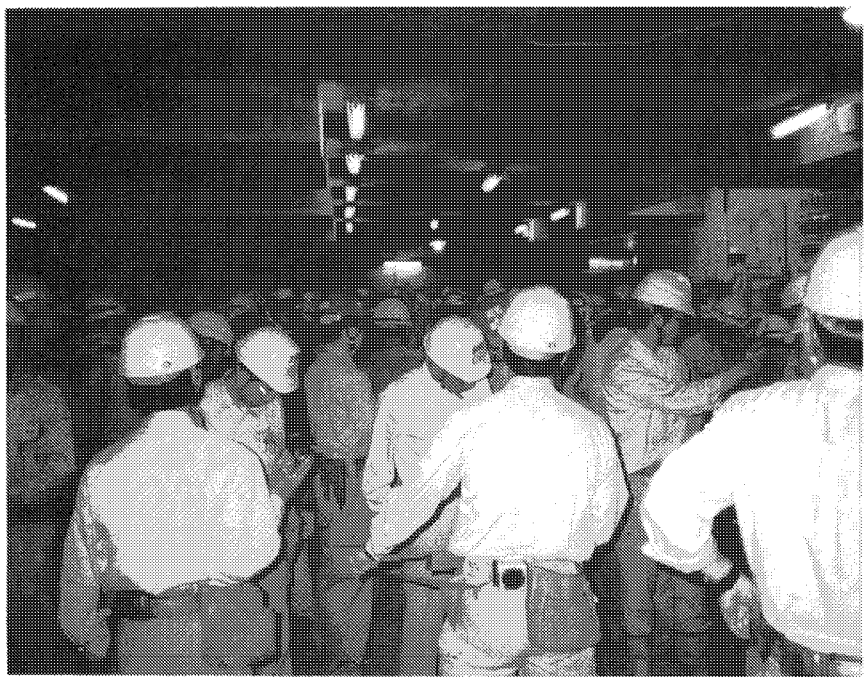


Different cultures and industry structures mean that different practices will be appropriate

Chapter 2:
A Comparison of International Construction Procurement

Introduction

In this chapter the ways in which construction is procured in different countries is described, in order to establish whether there is a 'better way' than the approaches that are currently used in the UK. The primary question addressed is how do the systems used in America and Japan differ to those in the UK? Do their systems more closely resemble a partnering approach, and is it possible to identify a superior performance that may be attributed to a different way of working? Before we address these principal issues, it is worthwhile drawing a few comparisons between the markets in each of these countries. What are their relative sizes, how are they structured, and what are their essential characteristics?

A Comparison of Markets

It is very difficult to make absolute comparisons between the construction markets in different countries. Each nation is entirely different in terms of the size and nature of its physical, climatic and demographic attributes. This means that the construction needs of each country vary, and their construction markets naturally reflect this.

Keeping this point in mind, it is still worth drawing a few broad comparisons to get an appreciation of the 'vital statistics' of a number of construction markets. Table 2.1 summarises data concerning population, GDP, and construction output in the UK, USA, Japan and Germany.

Table 2.1: International Comparisons (1993).[1]

Feature	UK	USA	Japan	Germany
Population (M)	58	250	125	66
Total GDP (£ Billion*)	523	4216	2820	1075
Construction Output (£ Billion*)	45.5	312.0	509.0	114.0
% GDP on construction	8.7	7.4	18.1	10.6
Construction investment per capita (£)	789	1248	4073	1735

Source: JFCC, Ministry of Construction, US Department of Commerce and Euroconstruct.
* Billion = 10^9

By far the largest construction market is located in Japan, valued at ¥81.4 trillion in 1994 (approximately equivalent to £509 billion).[2] It is worth noting that the UK market is one-tenth this size, while the population in the UK is only half that in Japan.[3] Japanese construction investment per capita is, therefore, five times the UK level, but has been in decline (in real terms) during the last few years.[4] Construction represents the largest single industry in the US. In 1994, the total market was worth $506,944 million, representing 7.5% of GDP.[5] This is approximately equal to £760,416 million.

Just over half of all construction demand (54.7%) in Japan is currently attributed to private sector clients, and most of this is due to private housing. Most public sector demand is attributed to civil engineering projects.[6] Analysis of the trends in output in Japan indicates an emphasis on new build. Often buildings are replaced or

substantially refurbished every 30 years, or so. This may be largely explained by cultural as well as environmental factors, such as earthquakes, which render expensive refurbishment's uneconomic. Repair and maintenance (R&M) works are not officially recorded by the Ministry of Construction, but are believed to contribute a further 16% to the total construction market. This is quite a low level of activity compared with the UK industry, where 50% of the total output is attributed to R&M. This sector of activity is not controlled by the Ministry of Construction and may, therefore, be described as a very free market with low barriers to entry and many small contractors competing for work. The larger contractors tend to focus on new build works.

The Japanese construction industry was the sector most hit by the collapse of the 'bubble economy' of the late 1980s, and is still considered to be floundering.[7] As the demand for domestic construction has decreased, contractors have found it increasingly difficult to maintain sustainable profits. For example Shimizu's profits have fallen during the 1990s and, in fact, the corporation (including its subsidiaries) made a loss during 1995.[8] Notwithstanding this, the average profitability of contractors in Japan is still double that for UK firms. Public spending in Japan has increased, in line with the government's Keynesian economic policy, but has not fully compensated for the reduction in private construction investment.

The main sectors of activity in the US are categorised as: private residential buildings; private non-residential buildings; utilities; other private work; public buildings; highways; military; conservation/ development; sewerage; water supply; and public miscellaneous.[9] By far the largest of these segments is the market for private residential buildings, which accounted for 47% of the total market for construction in 1994. The next largest proportion is 19% for the private non-residential buildings sector. Public sector construction amounts to just under 30% of the total market.

There are also a number of emerging markets in the States, especially in the field of environmental protection, mainly as a result of increasing public awareness of pollution issues, waste management, and so on. The preservation of structures with historical/ architectural significance is also a growing segment, as is

the market for the restoration of old and dilapidated infrastructure.

Industry Structure and Characteristics

The literature on political economy often places the USA and Japan at opposite ends of a continuum of ideological approaches to the relationship between government and business.[10] The United States is characterised by liberalistic tendencies, while Japan is renowned for its communalistic ideology. These different approaches tend to be reflected in the way business as a whole is conducted and, as would be expected, there are significant differences in the way that the construction industry is structured and its participants operate in these countries.

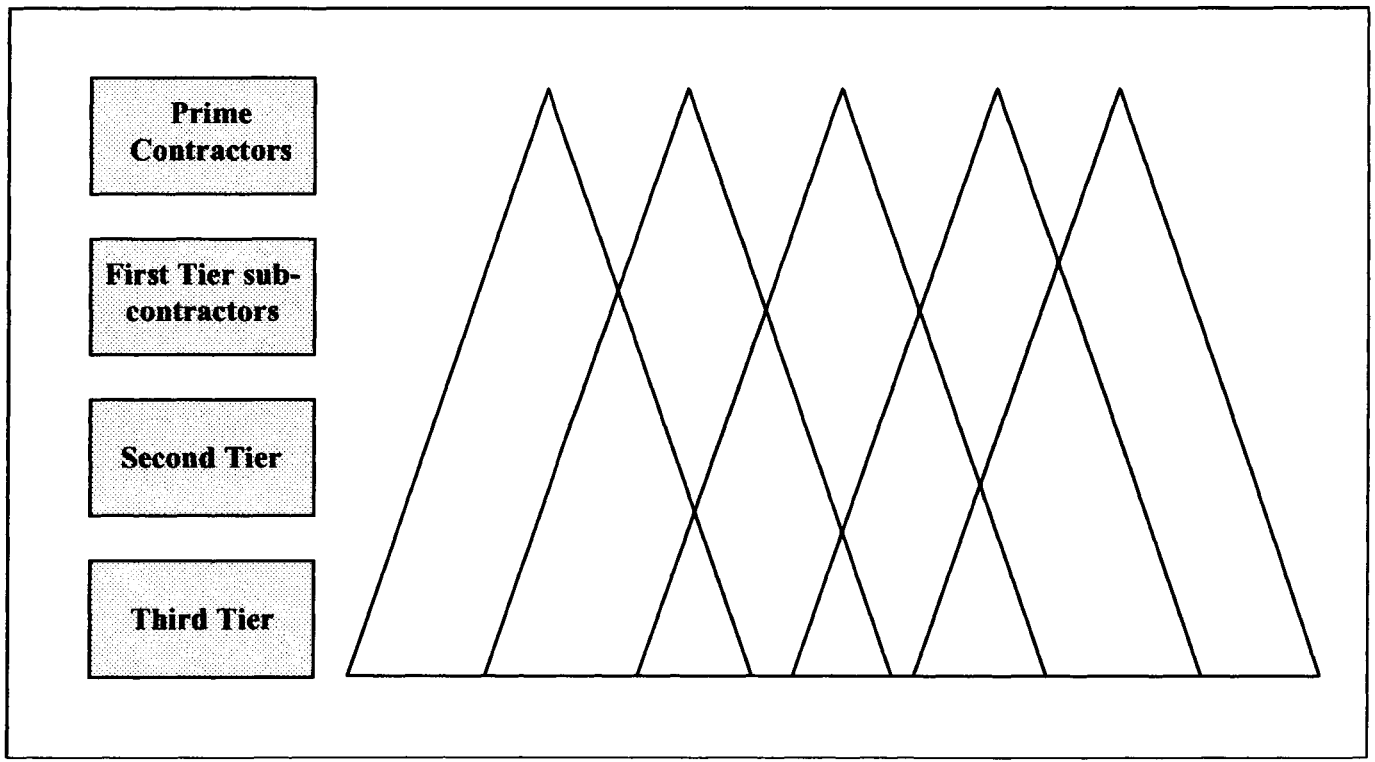
In this section the different industry structures are described in terms of the various players in the process: clients; contractors; sub-contractors; and professionals. Following this the different characteristics of each are compared. This means looking at the dominant business ideology, how this impacts on governmental policy, the nature of market competition, the view on investment and the location of power in construction supply chains.

Japan

The structure of the Japanese construction industry has been in place, more or less unchanged, since the end of the Second World War. It is characterised by networks of tiered, interlocking supply relationships, known as '*keiretsus*'. Figure 2.1 illustrates this principle. Firms at the top of a *keiretsu* will often have long-term relationships with key suppliers, and may even hold an equity stake in some of these. This structure is similar to that found in other industrial sectors in Japan.

There is currently no representative body for private client interests in Japan, although it is fair to say that the major clients have considerable power. The larger clients tend to have in-house professionals to facilitate the procurement process, especially in the public sector, while the smaller ones rely entirely on the expertise of the contractor.

Figure 2.1: Structure of the Japanese Construction Industry



The construction industry in Japan tends to be dominated by the 'big five' contractors: Shimizu; Kajima; Taisei; Takenaka; and Obayashi. To get a feel for the relative size of these corporations, it is worth noting that each has an annual turnover in excess of £6.5 billion, while the largest UK firm has a turnover of less than £4 billion.[11] It is generally considered that there is little difference between the larger Japanese construction firms.[12] They all tend to offer similar services and prefer to engage specialist sub-contractors, rather than employ direct labour for the execution of construction activities. They tend not to compete on the basis of cost differentiation strategies: competition tends to be on different level, often on the distinct techniques and technologies offered in providing construction solutions for their clients. Research and development activity is, therefore, given a high priority. It is recognised, however, that cost-based competition is most evident on local government contracts.

All Japanese contractors require a licence to operate, which is issued by the governor of the prefecture in which the firm's office is located, or by the Ministry of Construction, if offices are established in more than one prefecture.[13] The system of registration was developed to secure the proper execution of construction works and ensure client protection. There are approximately 543,000 licensed contractors in Japan, of which 73,000 are skilled sub-contractors.[14] Examination of data produced by the Japan Federation of Construction Contractors (JFCC) reveals that their industry is polarised in a similar way to the UK industry; there are proportionally very few large firms, while the largest industry segment is represented by sole traders.[15] Furthermore, the top-ten contractors have a 13% share of the market, while the top one hundred firms account for 30% of the total market.[16]

The prime contractors in Japan tend to have pools of skilled sub-contractors for specific categories of work; some may be selected on the basis of long-standing "special relationships", while others may be chosen as a result of part-ownership by the prime contractor. There is often no 'formal' contract between the prime contractor and its sub-contractors; the rules for conduct are based on the nature of the relationship. Sub-contractors operating within

this structure have benefited from a relatively secure and continuous workload. They have consequently been able to take a longer-term view on planning, resourcing and investment for the future.

There is evidence, however, that these 'special' relationships are not quite as strong as they once were. The reduction in domestic demand for construction is putting the viability of long-term relationships under increasing strain, and sub-contractors are now being forced to seek work from other sources in order to survive. The Ministry of Construction is also trying to encourage a more competitive environment in contracting, through the use of more open tendering and bidding for work packages.[17] Despite the pressure for change, there is a significant degree of inertia and the industry structure is still no where near as loose as it is in other countries, such as the UK or the United States.[18] This issue will be analysed in greater detail at the end of this section.

There appears to be less of an emphasis on the involvement of independent professionals in Japanese construction than in the UK. Third party checking and measurement is not normally considered necessary, and may be viewed as implying criticism or a lack of trust in the contractor. The view is that where trust exists, there is no need for this wasteful duplication of effort. There is, therefore, no major quantity surveying presence in Japan; the parties tend to rely more on trust and credibility to ensure work is completed and reimbursed appropriately. Disputes are also settled within the bounds of relationships, rather than be subjected to external scrutiny.

All architects, engineers and other design professionals must register with the required central and prefecture governmental bodies. Only architects, which includes structural engineers for the purpose of licensing, and land surveyors need to have a licence in order to practice.[19] There are three categories of licence required for building design or construction supervision, depending on the use, scale and type of structures involved: first-class; second-class; and wooden building architecture. Many architects are in fact employed directly by contractors.

USA

In the United States, The Business Round Table is probably the largest organisation representing client interests. It's membership comprises approximately 250 of the major manufacturing companies.

The market for contractors in the United States is also fairly polarised, with a large number of small to medium sized firms competing for the major portion of all commercial output.[20] Barriers to entry in general contracting are generally low, particularly at the lower end of the market. Movement up the scale is effectively controlled by the implicit restraints and requirements of financial and construction *surety-bond* institutions. The high incidence of contractor failure in the 1980s led to the increased popularity of surety bonding, in order to protect client interests.

American prime contractors are classified within three broad categories: residential; general; and engineering (including public utilities).[21] Matthewson has argued that the nature of the construction supply market is essentially a product of its customers' demand characteristics.[22] Although this might seem fairly obvious, it would certainly seem to be the case that the number, type and size of construction firms in a particular segment will depend on the demand and product characteristics of that sector.

The general contractors, due to their versatility and expertise in many styles of work, are considered to provide the backbone of the industry. Residential contractors build either single-family dwellings, multi-family units, or work in the home-improvement market. Engineering contractors construct non-traditional projects, either heavy construction or highways. Entry into this segment of the market requires high capital investments in plant and equipment. Consequently, there is only a small number of large contractors involved in heavy engineering. Often joint ventures are required on large and complex projects, such as transport or power station schemes, in order to pool the necessary resources. There is a large number of highway contractors, many of which are small in size and turnover.

There are several trade associations in the US construction industry, and three of the most influential of these are: the

Associated General Contractors of America (AGC); Associated Builders and Contractors (ABC); and The National Association of Home Builders (NAHB). Their combined membership represents approximately 1.7 million firms. Apart from the usual services to their members, they also form the Political Action Committee. This body plays a vital role in the industry, by lobbying government officials, in an attempt to influence prospective construction-related legislation. There are also dozens of other interest groups for the various specialist and trades contractors.

The design professionals in the US construction supply chain are generally in the form of multi-disciplinary architectural/engineering practices. The American Institute of Architects (AIA) and the American Consulting Engineers Council (ACEC) actively promote the assessment and appointment of these firms on the basis of qualification and quality criteria, and not lowest bid price. As in Japan, there is no core of quantity surveyors or independent cost managers, as re-measurement of completed work is generally not carried out. Much of the rest of the US industry resembles that of the UK.

Supply Chain Characteristics

Having gained an appreciation of the structural composition of the construction industries in Japan and the United States, the key question is *why are they different?* What are the features which underpin the different approaches to procurement in these two countries?

There appear to be a number of structural characteristics which dictate the way in which the participants in each industry are able to perform. These include:

- the dominant ideology concerning business management;
- the nature of governmental policy towards the industry;
- the resultant nature of market competition;
- the view on investment that firms are able to take; and
- the location of power in the supply chain.

Business Ideology

The Japanese approach to capitalism is considerably different to the Anglo-Saxon variant advocated in Britain and America. The latter version promotes values including: entrepreneurship; individual responsibility; labour mobility; profit maximisation; and free-market competition. In Japan, however, there is a much greater emphasis on values such as: business groups; social responsibility for skills; teamwork; loyalty to the firm; industry strategies; and active industrial policies that promote growth.[23] This approach has a significant impact on the way business is conducted and markets and organisations are structured.

The emphasis on the 'group' rather than on individual endeavour manifests itself in the use of joint ventures and collaborative projects. Work is often shared between contractors, especially on public sector contracts and during periods of economic difficulty. Joint ventures are particularly apparent on local government (prefecture) projects, where it is often a requirement for a primary contractor to form an alliance with a smaller local firm. This ensures the survival of the local economy as well as the continued prosperity of the major players.

Governmental Policy

The relationship between government and the construction industry in the US has been described as fragmented.[24] Neither the firms nor government have a single coherent policy toward influencing each other and promoting industry interests at home or abroad. This is in direct contrast to the Japanese, who have a long-term strategy for all critical sectors of their economy.[25]

In the States the situation is not too dissimilar to the UK, in that there are separate lobbying groups for construction firms, designers, builders, and design-builders. Each representative group has specific interests, objectives and strategies. Separate government agencies are also responsible for promoting industry interests, some of which will often ignore the wishes of the sector they represent, or even question the validity of government support in the first instance.

The confusion is exacerbated by the Congress's piecemeal and

reactive approach to legislation. Laws may be passed that effectively put the various government agencies at cross-purposes. Clearly, the approach to construction is no different to any other sector of activity in the US, and is underpinned by the dominant ideology of 'sink-or-swim' market place individualism. Adversarial relations exist between enterprises based on competition, bargaining and negotiation from an individual perspective.

Nevertheless, the industry is seeking to address certain policy objectives with Congress, including: more positive support/ discrimination for US funded work abroad; pressure to open foreign markets; access to finance on favourable terms.

In summary, it would appear that there is little in the way of co-ordinated and integrated policy planning in the US construction industry. The inherent danger of this approach is that in each section of the industry striving for maximisation, the net result is sub-optimal performance for the whole industry.

Market Competition

The Japanese construction market, certainly until very recently, was well protected from international competition.[26] The system of nominated tenders in the public sector and long-term relationships in the private sector, meant that very few foreign firms were able to penetrate the tightly interlocked industry structure. This should, in theory, slowly start to change as more foreign firms will have the chance to compete following the introduction of open bidding procedures in the procurement of public works. Some observers feel, however, that the degree of corruption in the present system for contract awards would be very difficult to overcome. Ingrained in the business culture is the practice of 'dango' (or collusion) between tenderers.[27] Several major cases of corruption have also rocked the industry in recent years.[28]

The market in the United States may be described as much more open and competitive. Despite the existence of natural barriers to trade, such as geographical location, there are relatively few artificial barriers. As we mentioned earlier in this chapter, however, there are a few barriers to growth, in the form of restrictions imposed by various financial institutions.

Investment

Japanese companies are able to take the long-term view, with much reinvestment in R&D aimed at developing new technologies, in order to increase productivity and competitiveness.[29] JFCC data indicates that the 'big five' Japanese contractors each invested an average of over one per-cent of turnover on R&D in 1993.

The Construction Industry Institute (CII) believes that US construction firms spend too little on research and development, as compared with manufacturing companies or contractors in other countries. They are also considered to have a sporadic and fragmented approach to investment, generally reacting to short-term needs.

There is one American contractor, however, which is considered to have a greater focus on investment than most. Bechtel one of the largest US-owned international construction firms has a reputation for being the most research orientated in the States. The company developed, by construction standards, an almost unique R&D department by the mid-1980s.[30] This included around 300 employees, encouraged to work on ideas without any immediate commercial application, including lasers, advanced energy systems, and so on. Bechtel reported that it holds approximately 150 patents and publishes approximately 500 technical papers annually. The results of past research are being applied to its operations in approximately 18 countries.

The key question is, what factor allowed Bechtel to invest more in R&D, when its competitors felt unable to take the longer-term view? The answer, quite simply, relates to the nature of the company's stakeholders. Bechtel is owned by its senior managers, who are forced to sell their stock back to the company when they leave. This form of ownership facilitates the long-term view, as the management look towards optimising the business in a sustainable way, rather than looking for short-term investment results.

The Nature of Power

It is clear that the control of certain critical assets, allied with the enabling factors of client trust, a complete construction service, and long-term relationships, has led to a situation where the major

contractors in Japan effectively control the construction supply chain. As a consequence, they have been in the fortunate position to assume the role of 'price-fixers', rather than 'price-takers' in the construction market.

This situation may not have been entirely clear to Japanese clients, nor would they have been duly concerned, during the period of high economic growth when the cost of construction was not their main priority; speed to market, quality, and price-certainty were the important performance criteria.

The major contractors in Japan tend to assume responsibility for the entire asset life of buildings. Following completion of the design and construction of a project, they will expect to be awarded any subsequent demolition or refurbishment works. To leverage this situation further, contractors will often hold all drawings, manuals and other critical information, rather than handing them directly to the client. In this way they are able to retain a high degree of control over the supply chain for operation and maintenance. Contractors also have the ability to 'lean' on local authorities in order to gain planning permission for a particular site. This may be used as a differentiating factor in attracting a potential client.

It is worth noting that the market for land is extremely difficult in Japan, and this can cause obvious difficulties in getting construction projects started. Land is rarely bought or sold, and this lack of availability means that rents are very high. The main barriers to land transfer are the high taxes incurred during transactions and the cultural attachments to ownership. Contractors often have extensive land banks to militate against this problem, and will also differentiate themselves from their competitors on this basis. Land is, therefore, a critical asset in the Japanese construction supply chain, which many contractors would appear to control.

Although the balance of power currently lies with the major contractors, the issues facing the industry are likely to bring this situation into question in the future.[31] The current changes in the economic environment mean that clients are starting to examine industry performance and practices. This point will be covered in more detail at the end of this section.

It is not possible to generalise in the same way on the locus of power in the US construction industry. In the USA it is more a case

of understanding the relative balance of power between client and contractor in specific supply chain situations. Clearly, the client has the ultimate 'leverage' through holding the funds for payment. This is what one commentator describes as the *Golden Rule*: "he who holds the gold makes the rules".[32]

It is often the case, however, that US contractors have a countervailing power in terms of the extensive bank of cost data they hold. In such cases, clients do not have any real understanding of the cost structures of the items of work or projects they are ultimately paying for. They may have an awareness of the large components, but the structure and detail is more elusive. This is why open book-costing is being utilised by some clients on partnering projects, in order to reduce the level of commercial vulnerability with their contractors. Over time, if they are able to adopt this approach, clients may establish a database of 'true' costs and gain further leverage over their contractors.

During the 1970s, the level of *trade unionism* in the construction industry meant that the balance of power had shifted away from both clients and contractors. It is now believed, however, that unions have largely lost their stranglehold on construction, although it is recognised that the industry is by no means monolithic, and the impact of unions varies from state to state. New York State, for instance, is still relatively heavily unionised. On the whole, however, the union labour market has shrunk to about 30%. There are two main contributory factors behind this decline: general public disenchantment with the unions; and the shift in use of manpower from union to 'open shop' labour. The US industry is now considered to be relatively free from labour problems and illegal operations/corruption, although public confidence and perceptions are still fairly low.[33]

Procurement Systems

Japan

Most construction work in Japan is procured on a design and build basis, usually for a fixed price – lump sum, with the contractor providing a complete ('turnkey' style) package for the client. In addition to construction activities, this will often include feasibility

and design services, and possibly even the procurement of a suitable site. Public sector clients, however, have traditionally developed their designs to a given level of detail before going out to tender.

Private Sector

Private sector Japanese clients are not particularly sophisticated in their construction procurement strategies; they have little expertise in construction and are primarily concerned with their core business activities. Consequently, they tend to devolve the responsibility for project delivery to favoured general contractors, "trusting" them not to take advantage of their relationship. It is fair to say that contractors have traditionally been the 'gate-keepers' of the construction supply chain in Japan, and offer a complete service to their clients. As such, they have held much power and have to a large extent dictated the structure of the industry. This situation has proved very profitable for the primary contractors in the past (as JFCC data indicates), and has been facilitated by a benevolent environment characterised by the booming economy and the communalistic culture.

Private clients have tended to rely on two main approaches in sourcing contractors. Appointment will usually be on the basis of a long-term relationship, or through a closed (nominated) tender. The relative proportion of each depends on the client concerned, and the characteristics of its particular projects. Schemes will invariably proceed on a design and build basis, and contractors are 'trusted' to produce good work, on time, and to an agreed lump-sum price.

When using a competitive bid process, selection will not always be on the basis of the lowest bid price. Other criteria may influence the sourcing decision, including: the nature of any business relationships (*keiretsu*); previous knowledge of the project; the availability of a favourable finance package; the ability to introduce a tenant on completion; or the provision of an advantageous land deal. At times the award of a contract may appear to be quite subjective, however, as the criteria for selection may be adjusted to suit. There is allegedly a high degree of collusion (known as *dango*) during the tendering process. Contractors can effectively establish a

cartel situation, and determine who's turn it is to win a tender by fixing prices. Although this practice is officially forbidden in Japanese Law, it is believed to be quite extensive, and has almost become accepted custom and practice. There are very few prosecutions made, although occasionally certain actions are taken to remind the industry that a law does exist.

Most private sector contracts tend to be awarded on a negotiated basis, often with a contractor from within the client's *keiretsu*. The lump-sum negotiated price is often high due to the lack of a 'value mechanism', such as competitive pricing, and the inclusion of high contingency allowances for risks. Clients are mainly content to pay a premium guaranteed maximum price (GMP) in times when their own businesses are performing well, as cost certainty is more important to them than low bid prices. There is evidence emerging, however, that globalisation may necessitate a more disciplined approach to cost management. Actual construction costs (excluding the costs associated with land scarcity) have been able to grow to relatively high levels in the contractor-led, protected domestic construction markets. The current recession, however, in conjunction with increasingly fierce global competition in their own specific markets, is now forcing clients to demand cost reductions from their contractors.[34] Even where competitive bidding is used by clients in an attempt to secure greater value for money, the market is far from 'free' due to a combination of *dango* (collusion) and the culture of long-term relationships.

Public Sector

Historically, almost all public construction projects were procured through nominated competitive bidding. This process required a tendered competition involving between five and ten *selected* contractors. Contract award was said to be on basis of lowest bid price. As a result of the Reforms of Bidding and Contracting Procedures in Public Works (Cabinet Understanding, 18 January, 1994), *open* competitive bidding was introduced for projects in excess of certain thresholds: [35]

- Central government entity: 4.5 million SDR;

- Quasi-government entity: 15 million SDR;
- Prefectures and designated cities: 15 million SDR;
- Works below the minimum thresholds may still be procured through the nominated competitive tender route.

There appear to be two main reasons for the increase in (western-style) open tendering for public works.[36] Firstly, due to sustained pressure from the United States over restrictive trade practices, leading to the World Trade Organisation (WTO) Agreement. Secondly, the need for improved value for money. As in the UK, it is believed that many public sector projects are subject to design changes during the construction phase, resulting in the budget being exceeded. Furthermore, the Japanese Government believes that the cost of construction, particularly on public works, is too high in comparison with other countries. It believes that by reforming bidding and contracting systems, it will be able to restore public confidence in the ministry and the construction industry and improve value for money.

Some local government clients have also elected to use open tendering as an option, although this is not specifically prescribed under the WTO agreement. The reason for this popularity appears to be linked with the perceived objectivity associated with open tendering; it provides a genuine reason for some authorities to escape the biased influence of local politicians in the contractor selection process.[37]

The open tendering process in Japan comprises three main stages: pre-qualification; nomination; and bidding. The pre-qualification process seeks to identify suitable firms, nomination screens these further against project specific criteria, before the best contractors are invited to submit their tenders. Approximately ten nominated contractors will be invited for most Ministry of Construction/local authority schemes.

The process of cost management on public works commences with the relevant government department determining the 'ceiling', or maximum price, based on estimates for that particular scheme. Works are then tendered, and the returned bids are assessed. Award of a contract is often on the basis of lowest bid price, providing it does not exceed the ceiling price. There are two

factors, however, which make it difficult for clients to establish whether value for money is truly being achieved, or not. Firstly, the level of collusion between contractors means that the reliance on market pricing to provide the most economic rate is essentially flawed. Secondly, according to RICE (the Research Institute of Construction and Economy), there is very little, if any, real data recording the final out-turn costs of projects, as compared with their original bid prices. If this is the case, how can public clients ever know whether they are achieving good value, or how much they are under/overspending? How can the necessary lessons be learned?

It is currently assumed, however, that the introduction of more open tendering will result in more open information on prices, which will in turn lead to greater accountability and value for money. As with the introduction of change in any environment there is some resistance to this, primarily from those with vested interests. Some of the negative perceptions include: the lack of objectivity and transparency in the nomination process; the lack of fairness; the lack of real accountability; and the likelihood of problems resulting from accepting the lowest bid price. If the necessary changes are made, there is also the danger that the practice of *dango* will be exposed. One commentator has expressed the concern that the Japanese do not know how to operate without this practice.[38] It is felt that such changes are perhaps too radical, and that a half-way house may be more appropriate, with bid and out-turn prices still kept secret.

One further problem arises with the increase in open tendering, which affects the small and medium-sized contractors. Many of these firms have traditionally been awarded packages of work through long-standing relationships with larger contractors in their respective *keiretsu* structures. The problem is that these firms do not generally have the experience of winning work through the open bid process, and are not particularly competitive as a result. The Japanese Government has recognised this point and has developed initiatives to encourage greater competitiveness in this area.[39] The *keiretsu* approach is also coming under increasing attack due to pressures resulting from globalisation and the recession; a reduction in work-load (and therefore spend) means

that one of the key factors underpinning the successful use of long-term relationships is undermined. This fundamental point is discussed later.

Case Study: Housing and Urban Development Corporation.
HUDC has been supplying housing units for sale and rental markets in Japan since 1955. Since its inception, the Corporation has constructed in excess of 1.3 million units. The head office is in Tokyo, with further branch offices are in Kanto, Kansai, Chuba and Kyushu. Its main activities may be summarised as:

- housing construction;
- construction of municipal/public facilities;
- housing management;
- urban renewal/development projects;
- transportation; and
- park development.

HUDC uses consultants in concept and detail design activities. In-house quantity surveyors produce estimates, cost plans and schedules. Two forms of contracting are employed: conventional tendering (60%) and design and build (40%). Design and build is used in order to increase the level of 'system building' (standardisation and modularisation). HUDC considers that the market choice for design and build contractors is generally limited to the 'Big 5'.

Open tendering is used for projects above Yen 2.16 billion. Below this threshold HUDC may use restricted tendering procedures, inviting between 10 and 12 firms following the prequalification stage. For smaller projects, below Yen 70 million, it may use a restricted tender competition by invitation. Selection of contractors is always on the basis of lowest compliant (lump sum) bid. Two stage evaluations are used on design-build schemes: performance (quality) and then bid prices.

As with many public sector clients world-wide, out-turn costs often exceed the original bid price, due to changes introduced. Client and contractor will negotiate any additional costs.

There is also evidence of joint ventures between small and large contractors, especially on local government projects. Often such arrangements will involve three firms, with the larger contractor attracting a 50% share and between 20% and 30% each for the smaller contractors. Joint ventures will generally be instigated by the smaller firms, or by the local prefecture clients. When tendering for such contracts, the relationship between the small and large contractors, paradoxically, appears to be both competitive and collaborative; direct competition takes place between the firms wishing to win public contracts, yet collaboration may also be instigated by the smaller firms who desire access to the technology, skills, expertise and financial backing of the larger contractors. These attributes tend to render the larger firms more competitive, and they are able to tender with relatively low margins in order to win public contracts. Local government clients are also moving towards a preference for joint ventures, and it may even be a condition of award for a large contractor to form a joint venture with a smaller local firm. Culturally speaking, the prime contractors also tend to have a social responsibility towards training and sharing work with their smaller counterparts.

Contracts

In Japan there is less emphasis placed on the preparation and administration of contract documents than in western countries. Technical requirements are abstracted from drawings and specifications, while the 'breakdown' (a rudimentary bill of quantities) is only referred to for the valuation of progress payments or significant variations in work.[40] Standard forms of contract are available for use on public and private sector works, which are relatively simple, prescribing only essential conditions and behaviours. A typical example is the 'General Conditions of Construction Contract' (Revised 1981), approved by The Architectural Institute of Japan, The Architectural Association of Japan, Japan Institute of Architects, The Associated General Contractors of Japan, Building Contractors Society, Japan Federation of Architects and Building Engineers Association, and the Japan Federation of Architect Office Association. Interestingly,

Article 1 sets-out the general principles and 'spirit' of performance for the contract, stating that 'The Owner and Contractor shall perform this contract sincerely through co-operation, good faith, and equality'.

Avoiding conflict and trusting each other are important attributes in any business relationship in Japan.[41] It follows that the application of contract conditions to resolve disputes are very rare, and there are laws and regulations governing contractual arbitration and litigation. Most forms of contract refer to these laws as a final means of dispute resolution only, although the emphasis is on settlement through mutual negotiation.

Cost Management

The order of priorities in the construction process for many Japanese clients has until recently been: **time**; **quality**; and then **cost**. In a growing and healthy economy speed to market was the main concern, closely followed by fitness-for-purpose. Although cost certainty was important, total costs were not the key issue, as clients were making healthy sums of money in their own sectors of activity.[42] This emphasis is now beginning to change, however, mainly due to the effects of increasing global economic pressure. Private clients are being forced to cut costs in order to compete. Lower economic growth is also putting increasing pressure on public spending. It is perhaps convenient that the WTO agreement has led to more open competition in the public sector, when one considers the unavoidable need for lower construction costs.

The process of cost management is not particularly transparent in Japan. The client tends to 'trust' the contractor to look after his best interests, and is happy to pay what it believes a project is worth to its business. The client will hold certain price expectations and will trust the contractor to meet these and provide a good service. Although many contracts are 'guaranteed maximum price' (GMP), with additional costs for genuine extras, clients do not see how costs are derived; cost structures are effectively hidden and under the control of the contractor. Furthermore, clients do not appear to hold any records of final construction costs, and official statistics refer to initial bid prices only. The true achievement of

value for money and the extent of cost over-runs is, therefore, difficult to establish.

The larger Japanese contractors have their own estimating departments, although they may use external consultants if their workload dictates, or if a specialist knowledge is required. There is no standard system comparable with UK codes for measuring work, such as CESMM or SMM. Estimates are developed using schedules of rates, which are similar to UK bills of quantities, although not as detailed. Work items tend to be 'lumped' together around trade items, such as concreting. Without a detailed break-down of items, it is difficult to establish how rates are derived.

Monthly payments are made in accordance with the proportion of work completed. Additional sums are only paid if there has been a significant change in the scope of work, otherwise the contractor will be expected to accommodate such fluctuations. The Japanese approach does not allow much flexibility for changes, even though this may be a perfectly valid approach for clients in a dynamic and changing environment. Life-cycle costing is not widely used, although designers aim for reliability and minimising maintenance and running costs.

In Japan contractors claims are anathema, but are on the increase as costs are becoming increasingly important to all concerned. It is also apparent that contractors may exhibit opportunistic tendencies with irregular clients, in an attempt to increase their margins, albeit in a subtle way. In such cases, the contractor's project manager will suggest design/specification changes which effectively boost the contractor's income, while providing a perceived benefit at the client's expense. Successful project managers are rewarded (promoted) on the basis of successful performance in this way. Contractors in Japan tend to have relatively high overheads, as compared with UK firms, although they also return larger profits. Profits provide the reward for taking risks, and good commercial project management will allow the contractor to convert estimated risk contingencies in to greater levels of profit.

As in many other countries, contractors can be flexible in the amount of money passed on to sub-contractors. To ensure the agreed cost to the client does not increase, and to ensure that the

main contractor achieves the required level of profit, it is possible for a sub-contractor to be forced to make a loss on a specific project. It is part of the culture, however, that the sub-contractor will be compensated on the next profitable scheme.

One notable feature of Japanese cost management is the practice of '*Kaizen*' – meaning 'continuous improvement'. Applied to improve performance in cost (similar to value engineering), quality, time and safety, the concept was actually inspired by the work of Deming after the Second World War. The 'plan, do, check, act' (PDCA) cycle has been applied very effectively to improve safety, time, quality and cost and fits well within the Japanese 'teamwork' culture. Their adaptation of value management/engineering aligns with this approach.

United States

There is probably a greater variety of procurement systems in use in the US. Whereas the Japanese focus heavily on the use of design and build in the private sector and design-bid-build approaches in the public sector, US clients tend to choose from a wider range of methods. A number of these are quite similar to the systems applied in the UK, already discussed in Chapter 1. Some require a little more explanation, however.

The type of procurement route and contract used naturally depends on a number of factors, including client priorities and the capabilities of the supply market. Some construction firms are almost exclusively involved in design and construct, while others are mainly engaged in construction management. Despite the emphasis on design and management services, there are still many firms in the US, especially the smaller ones, which have remained general contractors or specialist sub-contractors.

Contractors are appointed as a result of competitive bids and/or some form of negotiation. Competitive approaches include a 'lump-sum, fixed-price' or a 'lump-sum, unit-price' arrangement. Selection is usually on the basis of the lowest responsible bid. This traditional approach accounts for approximately 75–80% of all construction contracts awarded in the US each year.[43]

Negotiated bid methods include a range of different systems,

including: cost-plus; design build; turnkey; force account; and construction management.[44] These are largely similar to the approaches available in the UK, although there are notable differences in some cases. A brief explanation of the most widely used approaches is given below.

- **Design and Build**

The American approach is similar to the UK version, in that one organisation performs the design and construction functions. There are two types of design and build firm in the US: firstly, the major contractors which work on heavy industrial projects, such as petro-chemical and process plants; and secondly, the smaller builders, working on light industrial/commercial projects.

'Fast-tracking' is the term used to describe a form of design and build that involves the construction of a section of building as soon as it is designed.[45] Austin claims to be the pioneer of design–build and 'fast-track' working. The construction firm establishes a firm price, after preliminary design and analysis, and commences construction before detailed drawings are complete. The company only contracts in this way, and states that time and cost savings of 5–15% are achievable using this method.[46] There are, of course, other organisations equally committed to negotiating a fixed lump-sum price in this way.

'Turnkey' is the term used to describe the procurement system where the contractor provides a fully inclusive service in delivering the project to the client. As the name implies, all the client has to do is 'turn the key', open the plant and commence production. In reality, there is little difference between this approach and other examples of design and build or package deals.

- **Force Account**

This system, also referred to as 'owner-builder', essentially means the vertical integration of construction activities. Historically, government agencies and other public works departments in the US performed both design and construction functions internally. Some major private sector companies are also quoted as using the owner-builder approach, with some modifications, and include: Dupont, Coors, and Proctor and Gamble.[47]

- **Construction Management (CM)**

Advocates of this method stress the advantages of non-adversarial relationships between owner, designer and the construction management firm. The owner has the opportunity to fully participate in the process, while the designer appropriately controls the design, and the construction manager is solely responsible for all costs, time schedules, and delivery of the physical construction works.[48]

This system accounts for approximately one-third of the turnover in US construction/engineering firms.[49] Following an initial growth in popularity, the use of CM has now stabilised. The construction management approach originated within client bodies in the American building sector. A number of large property developers created their own organisations for the purpose of controlling, co-ordinating and managing the construction of their in-house projects. By sub-letting all construction work in appropriate packages, they were able to overlap the design and construction activities and achieve significantly faster project completion times. Having developed an effective process for internal customers, many of these organisations took an entrepreneurial view and offered their CM services to other clients. With its focus on cost and time reduction, construction management is now extensively utilised by private sector clients, as they are more likely to have the necessary flexibility to respond to the demands of this approach.

In many cases there is little real difference between construction management and general contracting, leading to the view that CM represents another layer of overhead and profit in the supply chain. There are two basic formats for this procurement approach in the United States: standard construction management and construction management 'at risk'. More usually, CM firms are hired for a fixed fee with the risk of sub-contract prices carried by the client. With the 'at risk' version, the CM carries the risk of variations in the final cost of work packages. The fee element may still be a fixed sum, or a percentage of the final construction cost.

It is often the case that the contract between construction manager and its contractors contains an agreement for a GMP. It is believed that this arrangement has become increasingly widespread, despite an understandable lack of popularity with contractors.

An increasingly common approach employs a mechanism for incentivising the performance of the CM, using a fixed fee and a share of any savings achieved. Some of the more sophisticated clients may employ 'open-book' cost management techniques in order to squeeze unnecessary cost out of the process.

It is important to note that there are differences between the approaches to construction management used in the UK and the US. The most important of these concerns contractual relationships. In America, the construction manager places the various work packages directly with its trades contractors, while in the UK contracts are between the trades/specialists contractors and the ultimate client. In the States the UK version is referred to as 'consulting'. This would seem logical, as the UK construction manager provides a professional management service, without necessarily offering any direct construction expertise. In this respect the US version more closely resembles UK style 'management contracting', although not entirely.

The construction manager normally acts as the client's agent. The CM may be solely concerned with managing the construction process or it may also provide design and procurement skills. As in the UK, it is normally precluded from direct construction involvement.

Construction management services tend to be offered by a wide range of organisations in the States, including: contractors; multi-disciplinary architectural/engineering practices; and specialist construction management firms. As in Japan, it is clear that design and construction activities are less sharply categorised and separated than in the UK. Many large contractors have extensive design departments and some design organisations are capable of contractually employing construction firms.

US building clients consider the following benefits can be achieved using a CM approach:[50]

- timely completion;
- strong control over cost; and
- fast-track projects, due to the overlap in design and construction activities.

Similar benefits are also reported by civil engineering clients, especially those in the power and transportation sectors, where CM is considered particularly effective in managing and controlling complex projects. For example, the CM arrangement is attributed as assisting clients to more readily satisfy the requirements of regulator and other statutory bodies. [51]

US clients tend to view construction management as an appropriate strategy for a wide range of needs. This is especially true for the larger, more complex projects, such as major refurbishment works, or perhaps where regulatory and environmental bodies demands are high.

There appear to be a number of reasons why the US construction industry is particularly amenable to the use of construction management, including:

- clients are prepared to accept the construction manager into his team and grant the necessary authority;
- the flexibility of design groups to accommodate sub-contractors suggestions;
- the willingness of architects to accept the construction manager as 'leader'.

- **Partnering**

The origins of partnering have already been discussed in Chapter 1. Although this way of working appears to borrow from the Japanese *keiretsu* approach, the concept of partnering emerged in the United States during the 1980s. The more recent trends in this area of procurement in the US are described below.

A member of the CII in Austin, Texas, believes the use of strategic/alliance partnering in construction is now becoming less popular in the States. Although there is little empirical evidence in support of this assertion, it appears that there are a number of

factors which give credence to this view. These primarily concern the current changes in the structure of client organisations and their resulting approaches to procurement.

It would appear that in recent years there has been a trend towards more de-centralised authority and responsibility in many organisations. This has often led to a more fragmented approach in the management of company operations, including the way in which the supply base is managed. The newly-empowered decision makers, understandably, feel less bound to accept the centrally imposed view of how supply chains should be managed. As partnering relationships were often the result of centrally developed procurement strategies, there may be a tendency for them to be rejected in favour of supply arrangements which focus on more local and immediate benefits and costs.

As would be expected, such changes in client procurement behaviour will have a causal effect on the stance adopted by the supply side of partnering relationships. It is perhaps inevitable that contractors will question the validity of remaining in such disciplined arrangements, if the benefit of regular turnover becomes less forthcoming. After all, where is the incentive to invest so much effort and resource without some form of tangible return?

Conversely, the application of *project partnering* has grown immensely in popularity. It is worth noting, however, that this approach is becoming more widely known as 'team-building'. The CII believes that organisations are experiencing varying degrees of success using project-specific partnering, but many are committed to this non-adversarial way of working.

Private Sector

The primary system used in the private sector is that of *lump-sum competitive bidding*. This accounts for approximately 75% of all construction contract awards, and mainly involves fixed price arrangements.[52] The balance of private sector work is procured through a mix of unit price, negotiated, turnkey, construction management and other client-customised approaches. The selection of a particular procurement strategy naturally depends on what is appropriate for the specific circumstances encountered by

the client. For instance, complex projects do not lend themselves to the imposition of a GMP, due to the obvious risk of many changes occurring. Furthermore, construction projects of this nature will require greater client participation in the evolution of the scheme, possibly using construction management.

In terms of the negotiated approaches used, cost-plus contracts allow maximum flexibility in terms of the method of reimbursement. The 'plus' element could refer to a number of alternative payment mechanisms, including: an agreed percentage of the construction cost; a fixed fee; profit sharing; a sliding fee; or a combination of these. The main benefit is considered to be the flexibility in meeting cost variations between the designed project and the amount of physical work done.

The role of 'commercial director' tends not to be recognised in the United States. The procurement of sub-contract packages is undertaken by project personnel. Many construction firms tend to have relatively small and stable pools of sub-contract firms. It is common practice for the CM or general contractor to pass the same commitments and responsibilities on to their sub-contractors as they make with their clients.

The practice of 'bid-shopping' is believed to be fairly common in America, especially within the general contracting arena for public works tendering. This term describes the process whereby a contractor plays one sub-contractor against another, in order to force the price of trades packages down and, therefore, maximise the contractor's margin. This often means that bids are under-priced, which inevitably results in problems occurring on site. The 'bid depository' process for collecting supplier quotations was touted as a remedy for this problem.

Public Sector

Public sector procurement systems rely almost exclusively on the 'design-bid-build' sequence of events. Traditionally, public clients employed in-house design specialists, although the appointment of external consultants, using an appropriate competitive bidding mechanism, is now more common.

The selection of contractors is almost exclusively on the basis of

Case Study: New York City Transit

New York City Transit is an agency of the Metropolitan Transportation Authority in the State of New York. NYCT is responsible for the operation of New York's subway system and is essentially equivalent to the UK London Underground Ltd. On an average weekday over 3.4 million people use its rail services. The Agency maintains a rail network in the Bronx, Brooklyn, Manhattan and Queens, comprising 706 miles of mainline track, extending over 230 route miles, with more than 6000 rail passenger cars, and 461 stations. The busiest of these is Grand Central with 31.2 million passengers a year.

NYCT has an annual construction spend of approximately $1 billion (US). The main areas of this spend include: station re-build projects; new routes; escalators and elevators; electrical work; signals; automatic fare collection; and general maintenance.

Consultants are appointed using a two-stage bid approach, encompassing both quality and price criteria. Contractors are procured mainly through the traditional open tender route, incorporating a 5% bid bond to ensure that only serious contenders respond. When there is a need to fast-track a project, the tender will require price and schedule proposals. Selection of the best tender will be based on a business case decision, balancing bid price with the cost of delays during works for each proposal. There is occasional use of 'partnering' on projects where there is a need for integration, fast-tracking, or where the likelihood of changes is high.

a 'lump-sum, unit price' arrangement. This is entirely similar to the traditional UK system involving schedules of quantities and re-measurement on the completion of works.

Public sector organisations are now beginning to be concerned with the need to cut costs. As in the private sector, public sector

clients have recognised that the traditional practices of separating design from construction, and appointing contractors using competitive tendering, may no longer yield the most desirable result. Some public bodies are experimenting with design and build, while others are using cost-reimbursable contracts. Both these approaches were previously considered too "risky" for use on public sector construction projects.

Cost Management

Clients will naturally attempt to engage contractors on a fixed price basis, where the scope of work is well defined. Cost-reimbursable contracts are more commonly applied where the design is incomplete. In this case an estimate is produced to ensure a sufficient budget allowance and to fix the contractor's fee. Of course, it is possible to adopt a GMP where the owner requires a greater level of cost-certainty.

As in most countries, it is the contractors who hold the real information concerning costs and how they are derived. On cost-reimbursable contracts, clearly the client gets to know much of this information, but has no real benchmark as a measure of value for money.

Value management/engineering (VM) is one of the tools used to reduce costs. VM provides a systematic and logical methodology to enhance project 'value' throughout the life of the facility.[53] The technique incorporates the whole value process and includes value planning, value engineering and value reviewing. The basic steps followed at various stages in the developemnt of a project are:

- establishment of functional objectives of the project (objectives, information, criteria and function analysis);
- identification of alternatives (speculation); and
- examination of cost and value of each alternative to enable 'best value selection' (evaluation and recommendation).

The process originated during World War II within the General Electric Company in the USA.[54] The main driver for the development of this technique was caused by the increased demand,

but shortage of materials during this period. GEC rose to the challenge, using substitute materials in many of its products. Surprisingly, the company found that through the careful application of substitute materials, product quality could be improved as well as costs reduced.

The formal, structured approach is not always applied and the perception is that all good designers do this in any case.[55] Phillips argues that VM is often introduced too late in the project process by unqualified people and has, therefore, developed a poor reputation; the process tends to be viewed by some as 'cheapening' the project, resulting in lower levels of quality. There is no doubt that the technique is still a valid and widely used tool to reduce cost on projects.

The CII has argued that there is a significant potential for cost reduction in US construction. In a report on project management practices and performance, it recommends that only the following areas provide scope for savings, in terms of a percentage of total project cost:[56]

- strategic project organising – involving all key stakeholders from outset (15%);
- design effectiveness – incorporating contractor involvement (10%);
- HRM (10%);
- project controls (10%);
- management of quality (8%);
- materials management (5%);
- contracting practices (5%); and
- safety (5%).

The combined integrated effect of the improvements in these areas is predicted to amount to 25%.

Benchmarking Performance: Which Approach is Best?

There is currently a tendency within construction, and indeed within many other industries, towards the discipline of

benchmarking performance and practices. There are two principal assumptions underpinning this approach: first, that measuring the relative performance of your country, or firm, against that of another will indicate what can be achieved with your own; second, that copying the practices of the better performers, will inevitably lead to similar end results in your own environment. This is what is meant by aiming for 'World-Class' and 'Best Practice' performance. Clearly there is something to be gained by comparing the performance and practices of others with your own. There are, however, potentially problems with this methodology, and several questions arise:

- Is it possible to directly compare performance? Are we making like-for-like comparisons, or are there fundamental differences which mean that the performance achieved in one context may not be achieved in another?

- Can practices be directly transferred from one context to another? Or are there critical success factors which make a specific action valid in one context, but inappropriate in another?

The procurement approaches adopted in Japan and North America exhibit quite distinct characteristics. This is entirely symptomatic of the different ideological approaches to business dominant in each of the countries concerned: the individualistic (liberal) focus of the US, contrasted with the communalistic, or corporatist approach of the Japanese.[57] Generally speaking, the prevailing approach in the UK is more similar to that in the United States, i.e. adversarial leverage. The fundamental question is this: *is it possible to identify which approach is best?* To address this issue, it is necessary to consider the relative performance of the construction industry in each country.

A Comparison of Performance

The common perception is that the Japanese and American construction industries are able to achieve higher levels of

performance than their foreign counterparts. Is there any substance to this, and is it possible to make direct comparisons? In addressing these issues it is necessary to explore the measures of construction productivity and costs achieved in different countries, in an attempt to understand how variations in performance may occur. Table 2.2 summarises productivity data for the UK, USA, Japan and Germany in 1993.

Table 2.2: Construction Productivity.

Measure	UK	USA	Japan	Germany
No. Construction Workers (Million) (% of total workforce)	**1.4 (6.7)**	**7.0 (6.0)**	**6.4 (9.9)**	**2.0 (6.7)**
Productivity: total output per worker in 1993 (£k)	**32.3**	**44.3**	**108.4**	**63.5**
Relative productivity* 1975 (1991)	**89 (102)**	**125 (86)**	**100 (100)**	**80 (85)**
Relative productivity** 1980 (1992)	**100 (150)**	**100 (N/A)**	**100 (131)**	**100 (117)**
Contractor Profitability (19--) (Profit margin, %)	**1.56#**	–	**3.50***	–

Source: JFCC; Ministry of Construction; US Department of Commerce; Euroconstruct and DoE.
*JFCC data.[58] **DoE data.[59] #NatWest Securities data.

It is possible to calculate a 'crude' figure for construction productivity, by dividing the total output in a given period by the average number of workers operating in the sector during the same period. Comparing values for gross output per man, it would appear that Japanese workers were more than three times as productive as UK construction workers in 1993. It must be remembered that factors such as exchange rate differentials will distort the picture, but even so, this measure really only indicates that the Japanese have a higher cost of construction per worker.

It is interesting to note that data from both the JFCC and DoE tends to present the UK construction industry as more productive. The DoE figures indicate a great improvement in the productivity of UK construction since 1980. These are not absolute measures of

productivity, however, and only indicate the performance of each country relative to a notional benchmark of 100, set in 1980, assuming entirely similar levels of performance at that time. The JFCC figures indicate that UK construction was less productive than Japanese construction in 1975, but was outperforming it by 1991. Again these are arbitrary measures, assuming Japanese construction to be 100 in both years. (Crucially, however, Japanese contractors are more profitable than their UK counterparts. This provides them with the financial resources to be able to invest in R&D, etc.)

If the relative cost performance between these countries are analysed, according to OECD data in Table 2.3, it would appear that Japanese construction is relatively inexpensive. UK construction, on the other hand, appears to be considerably more expensive. How were these figures derived, and what do they really tell us?

Estimated out-turn costs were calculated for a series of hypothetical projects by cost consultants in each country. Average costs were then normalised, relative to a UK benchmark of 100, using 'purchasing power parity' (PPP) rates. These factors effectively remove the influence of differentials between market exchange rates on the average price levels between countries. The methodology for calculating costs was subject to national interpretation, however, and may not be absolutely comparable, but still gives a reasonable indication of relative out-turn costs.

The Atkins Report[60] concluded that the range of variations in costs between countries could largely be explained by the differences in national levels of specification and design codes. Nevertheless, the UK was amongst the high cost countries considered. The figures also indicate US construction to be expensive, although the commonly held view is that the American industry has a superior cost advantage, due to: more functional designs; greater standardisation of designs and components and greater economies of scale associated with the size of the market.[61]

Table 2.3: Cost Performance Indicators (1990)

Country	Buildings		Public Works		TOTAL
	Market Rate	PPP	Market Rate	PPP	
UK	100	100	100	100	200
USA	73	108	76	112	220
Japan	86	77	98	88	165
Germany	97	96	75	74	170

Source: WS Atkins from OECD data.
UK benchmark = 100.

While the above data indicates that the Japanese industry offers the lowest costs in construction, The Research Institute of Construction and Economy in Tokyo has argued that this gives a distorted impression. The OECD study is essentially limited by the number of projects considered; the source of cost information was limited to six typical public projects and six typical private building projects only, which may not be representative regardless of any flaws in the comparative methodology. In reality, RICE and others in Japan believe their costs of construction to be higher than elsewhere, due to: high labour costs; *dango*; high specification for structures (for earthquake protection, etc.); and inefficient procurement systems.

Due to the lack of sources of meaningful data, differing specifications, and the multiplicity of factors which affect cost, Atkins has also argued that conclusions drawn from OECD data should be treated with caution. The difficulties with making direct cost comparisons for construction across different countries, have been further explored by Meikle. He has recommended that the following issues be considered to facilitate reliable comparisons:[62]

- Is there a fair comparison of specifications? Functional schemes will clearly be cheaper than prestige projects.
- Are the base dates similar? Exchange and inflation rate differentials will distort the comparison.
- Is the scope of costs similar? Are all external works, charges, fees, land costs and performance incentives included?

- Are the locations comparable? Different location types (e.g. green-field, urban, provincial, or capital city) will attract inherently different development cost regimes.
- Are the procurement methods comparable? There will invariably be a trade-off between cost and duration, depending on the priorities concerned?

His conclusions are: it is difficult to compare performance – the data are not clear and are not always comparable and there are many factors which influence performance. There is a need to understand these, before drawing meaningful conclusions and a need to understand the context.

Understanding the Context

It is probably fair to say that the Japanese k*eiretsu* system has thrived during a period of high economic growth. An increasingly successful private sector, with firms like Toyota, Nissan, Sony, Sharp and many others continually expanding their businesses, has meant that there has been a regular and high demand for construction. This regular spend has allowed the long-term relationships between client, prime contractor and sub-contractors to develop and prosper. Thus, continuity of demand has allowed the Japanese construction industry to maintain its stable structure of tiered networks.

The exceptional performance of the private sector has meant that the Government has also benefited from a continuous income stream, in the form of tax revenues from the successful businesses. This finance has facilitated a great deal of urban planning, resulting in a significant programme of general public and infrastructure works.[63] The problem is that a high level of public spending is only sustainable during a period of high economic growth. With a down-turn in the economy, both private and public sector clients must reduce their costs. This often means that construction demand is reduced and this critical success factor, and the economic changes currently undermining it, will be explored in more detail later.

Notes

[1] Source of data: Japan Federation of Construction Contractors (1995) *Construction in Japan, 1995*: quoted from Ministry of Construction, US Department of Commerce and Euroconstruct Conference; DoE (1995) *Digest of Data for the Construction Industry* (Second Edition), London: HMSO; WS Atkins International Ltd. (1994) *Strategies for the European Construction Sector: A Programme for Change,* Wadhurst: Construction Europe.

[2] Ministry of Construction (1995) *Construction Market and Government Procurement in Japan, First Edition.* The conversion to £ sterling has been calculated using the exchange rate of approximately ¥160/£. Please also note the use of US definitions for billion (10^9) and trillion (10^{12}).

[3] The total output from UK construction was valued at £46.3 billion in 1994. The population in Japan numbered 124.7 million in 1993, and 57.8 million in the UK.

[4] Research Institute of Construction and Economy (1995) *White Paper on Construction in Japan in 1995*, Tokyo: Ministry of Construction.

[5] US Bureau of the Census, (1995) Statistical Abstract of the United States: 1995 (115th Edition), Washington DC

[6] Ministry of Construction (1995) *op. cit.*

[7] Ohsono, T. (1995) *Charting Japanese Industry: A Graphical Guide to Corporate and Market Structures*, London: Cassell.

[8] Shimizu Corporation, *Annual Report*, 1995.

[9] *Ibid.*

[10] Thurow, L. (1994) *Head to Head: The Coming Economic Battle Among Japan, Europe and America*, London: Nicholas Brealey.

[11] Davis Langdon Consultancy/BSRIA (1995) *Construction in Japan: opportunities for UK suppliers, contractors and consultants*, London: BSRIA.

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[13] Research Institute of Construction and Economy (1995) *Japan 1995–1996*, 'Asiaconstruct' Conference, Tokyo, November 1995.

[14] JFCC data from March 1996.

[15] Japan Federation of Construction Contractors (1995) *Construction in Japan-1995*, Tokyo, JFCC.

[16] JFCC data from 1992.

[17] Research Institute of Construction and Economy (1995a) *op. cit.*

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[21] Ibid.
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[25] Thurow, L. (1994) *op. cit.*
[26] Bennett, J., Flanagan R. and Norman G. (1987) *op. cit.*
[27] Ohsono, T. (1995), *op. cit.*
[28] Asahi News Service (1993) 'Construction Boss Held in Bribe Probe', *Asahi Evening News*, September 21.
[29] DTI (1995) *Time for Real Improvement: Learning From Best Practice in Japanese Construction R&D*, Ascot: CIOB.
[30] Strassman, W.P. (1988) *op. cit.*
[31] Interview with Professor T. Hasegawa, Meikai University.
[32] Quote from Chuck McGinnis, Associate Director, Construction Industry Institute, Austin, Texas, USA.
[33] Matthewson (1991), *op. cit.*
[34] This view was stated during a number of interviews with senior Shimizu representatives.
[35] Ministry of Construction (1995) *op. cit.*
[36] Research Institute of Construction and Economy (1995a) *op. cit.*
[37] Ministry of Construction (1995) *op. cit.*
[38] Interview with Professor T. Hasegawa, Meikai University.
[39] Research Institute of Construction and Economy (1995a) *op. cit.*
[40] Yamashita, K. (1990) 'Comparison of Construction, Japan and US', *Merck Engineering and Technology Conference, Baltimore, USA, 25 September 1990.*
[41] Ibid.
[42] Interview with Professor T. Hasegawa, Meikai University.
[43] Matthewson, C. (1991) *op. cit.*
[44] Ibid.
[45] Ibid.
[46] Strassman, W.P. (1988) *op. cit.*
[47] Clough, R.H. (1975) *Construction Contracting* (Third Edition), Wiley.
[48] Matthewson, C. (1991) *op. cit.*
[49] CIRIA (1983) *Management Contracting* (Report 100), London: CIRIA.
[50] Ibid.
[51] Ibid.
[52] Matthewson, C. (1991) *op. cit.*

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Chapter 3: Current Proposals for Change in the UK

Introduction

In Chapter 1 the problems associated with the management of construction supply chains in the UK were discussed. The evidence clearly demonstrates that there is a need to address the fundamental problem of the fragmented industry structure, for the construction process to become more cost-effective and quality-focused for its customers, as well as more profitable for its participants. In Chapter 2 the approaches adopted in the US and Japan were described, to determine whether there was any similarity of approach which could provide lessons for UK implementation. In addressing this issue, two fundamental questions were raised:

- is there a better way of procuring construction elsewhere?
- can benchmarking the performance and practices of others lead to improvements in the UK industry?

It can be argued that there is no clear evidence to categorically confirm that organisations in Japan and the USA are inherently more efficient in their approaches to managing construction supply chains. Furthermore, our research leads us to conclude that it is highly unlikely that blindly copying the practices of others will

result in the desired sustainable improvements in performance. Our own view is that it is necessary to appreciate the context within which the different practices adopted successfully in other countries operate: we need to know 'why' different approaches work, not just 'what is done' or 'how it is done'. It is necessary therefore, to understand the critical factors that underpin the successful use of different procurement approaches, both in a strategic sense and in operational practice. This point is fundamental and is a recurring theme through this book.

Given this background it is now possible to consider the various initiatives that have been presented as the basis for improvement in the UK construction industry. This chapter looks at the major recommendations put forward by the industry and Government, in the *Latham Report*,[1] *Setting New Standards*[2] and *The Levine Scrutiny*[3] Several important questions arise:

- What do each of these initiatives seek to achieve?
- How does each initiative define the problem?
- What actions are prescribed to tackle the issues presented?
- Are any of the prescriptions likely to succeed in achieving lasting improvement in the industry?
- Do any of the initiatives adequately address the fundamental problem of the fragmented structure of the industry?

While there have, of course, been other recommendations for change, emerging from other construction-related bodies, such as The Clients Construction Forum, The Reading Construction Forum, and The Royal Academy of Engineering, to name but a few, the focus here is on those initiatives that have carried the imprimative of government and industry approval. As we shall see the bias of all of these initiatives tends to be in favour of the industry developing a more long-term collaborative, or partnering, approach. As we shall argue this may be a simplistic way forward for the industry.

The Latham Report

The work carried out in the Latham Report probably represents the most comprehensive and co-ordinated attempt in many years to cure the industry's ills. A great deal of consultation took place with all parties involved in, the construction process, in order to produce the final report *Constructing the Team* in July 1994. Since then, many of the report's recommendations have been partially, and in some cases fully, acted upon.[4]

Sir Michael Latham was commissioned, jointly by the Government and by the construction industry, to conduct a review of procurement and contractual arrangements in the UK. The chief aim of the review was to *'formulate recommendations addressing the problems faced by the industry, and to assist clients in obtaining high quality projects, through better performance and fairness to all'*.[5] The final report is widely seen as a catalyst for much needed change[6] and, considering the importance of the issues involved, the review was certainly overdue.

In his foreword, Sir Michael stated that some recommendations were radical, and that participants in the construction process could react to them in three ways: essentially, they could ignore them (at their peril); pick-out the sections that suited them best; or enact the whole package. Latham strongly supported the latter and has warned against 'cherry-picking', highlighting the need for the enactment of all recommendations to resolve the closely interlocked issues.[7]

Sir Michael produced thirty main recommendations, with over fifty separate tasks, for the industry to effect the desired improvements. A summary of the essential elements of the recommendations were presented under the following headings:[8]

To Clients

Several recommendations were directed towards clients, both in the public and private sectors. Perhaps the most important of these was the proposal for a Construction Clients' Forum (CCF), to represent fragmented and widely dispersed private sector clients. It was also argued that Government should become a 'best practice' client, to ensure value for money in public spending. A number of guides and

codes of practice, including the Construction Strategy Code of Practice and a checklist guide to briefing, were also recommended to assist clients in obtaining their construction needs more effectively.

To Industry

To ensure long-term survival, the industry was urged to cut its costs by 30% by the year 2000. Although considered by many to be achievable, there are many traditionalists within the industry who baulk at this target.[9] The industry was also exhorted to improve its tendering arrangements, upgrade its selection processes, improve its training, education and image, and implement an equal opportunities programme.

Regarding Contracts

Standard forms of contract were endorsed, to ensure good practice and reduce the need for bespoking'. The NEC was commended as fulfilling most of the needs of a modern contract. It was also suggested that client and sub-contractor representation should be improved on the contract writing committees (JCT and CCSJC).

On Legislation

Latham also proposed that legislation would be required to underpin various proposals, including: the banning of unfair contract conditions; providing for trust accounts and adjudication; reforming the law on liability; and the provision of a mandatory ten year latent defects insurance for commercial, industrial and retail construction.

The total package of improvements included a variety of other recommendations, all of which treated specific aspects of the construction process which Latham felt required attention, including: consultation with the process plant industry; production of a checklist for design responsibilities; the co-ordination of design information; a clearer definition of roles and responsibilities of project managers; further research into the effectiveness of BS 5750 (Quality Assurance) on site performance; as well as the need for advice on the use of 'partnering' in the public sector.

Although the Latham Report clearly tried to improve the performance of UK construction and provide a catalyst for change, the question must be asked: will the proposals receive the necessary backing and change the industry, or will the various factions in the industry support only those recommendations which suit their own interests, and be launched into conflict over the remainder? If the latter occurs, the Review will not achieve its aims, and may conceivably result in the exacerbation of divisions within the industry. It is our view that the Latham Report has several fundamental weaknesses, which are explored later in this chapter.

Setting New Standards

The White Paper *Setting New Standards* is essentially a reaction to the changing role of government in the UK, and the way in which public services are provided. Major policy changes during the last twenty years have meant that there is now a sharper distinction between government as a policy formulator and as a direct provider of public services. Under the Conservative Government, the underlying assumption was that the delivery of services should be undertaken entirely by the private sector. The main drivers for this approach appear to have been dissatisfaction with public service productivity and value for money, and the Government's ideological belief that market-testing leads to the more economic provision of services. The belief is that because the private sector is more willing and able to take *commercial risks*, the private sector should deliver public services *more efficiently* than the public sector.

The impact of this strategy is that government becomes a 'buyer', rather than a direct 'provider'. This is currently evident in the amount of market-testing, outsourcing and asset transfers taking place, all of which involve the clear separation of purchaser and provider. This has a profound impact on the way Government operates; it means that procurement must become a core competence in public service.

The Government recognised this situation when it outlined its strategy for raising the performance of public sector procurement in the 1995 White Paper *Setting New Standards*. The stated aim is to

achieve '*continuing improvement in value for money, based on whole life cost and quality, and to enhance the competitiveness of suppliers, through the development of world-class professional procurement systems and practices.*' The strategy is concerned with all categories of public spending, although construction receives special attention, probably due to the proportionally high spend in this area.

The key elements of the strategy in *Setting New Standards* comprise a set of proposals, intended aims, and 'best practices' which are intended to improve the performance of public procurement. They may be summarised as:

- **Best practices:** departments should seek to match the cost savings achieved by best practice private and public sector client organisations, and collaborate to achieve best value for money;

- **Value for money:** best value for money should be sought to through a range of procurement techniques, including: PFI; market testing; and contracting out;

- **Intelligent customers:** well defined objectives/requirements should be identified;

- **Integrated procurement process:** the emphasis should be on whole-life costs, not just short-term lowest price;

- **Business case:** greater attention should be given to the development, assessment and management of business cases, risks and contracts.

- **Training:** should be enhanced to produce 'world-class' professional procurement staff.

- **Benchmarking:** systematic measurement of performance to support continuous improvement.

- **Competition and collaboration:** wherever practicable, contracts should promote continuous improvement and benefit sharing.

Focuses on particular aspects of public procurement, including: So far as construction is concerned....

The Levene Scrutiny

Published only two months after *Setting New Standards,* the Levene Scrutiny focused in greater detail on the role of various government departments and agencies in the procurement of construction work, and how to ensure that they would perform as 'best practice' clients.[10] The review was undertaken with two fundamental aims in mind: to improve value for money in the procurement of public works; and to improve the competitiveness of suppliers to the government. The terms of reference for the 'Scrutiny' included:

- a review of existing practice, guidance, policy and strategy in government procurement and the relevant recommendations from the Latham Report;
- identification of best public and private-sector practices in construction procurement;
- identification of any special features in the relationship between government and the industry, which distinguished it from other clients; and
- an examination of major public contracts where the out turn cost significantly exceeded the original scheme cost.

The report concluded, as Latham had already stated, that the construction industry was in pretty poor shape, and that it had a long way to go before it could match best practices found in other sectors. It considered that the performance of government bodies was a contributing factor, and that there was a direct and causal link between client behaviour and the practices of industry participants. It also recognised that although some departments

exhibited examples of 'good practice', there was still much room for improvement. This was clearly demonstrated by the fact that too many government projects exceeded their budgets and/or completion dates. Of the 20 schemes considered in the Scrutiny, the aggregate increase in approved budgets exceeded more than £500 million, representing additional costs of 24% in real terms. Too often, it found, departments did not understand the industry, its workings and the importance of the need to do so. This resulted in distant, reactive relationships with a focus on the symptoms of problems, rather than the underlying causes.

These are profound findings, but do the proposals adequately deal with these fundamental issues? The report proposes five action points, developed into twenty-two recommendations, which are designed to facilitate Government in managing its projects more effectively, and encourage the industry to be more customer-focused and less adversarial. The proposals are summarised below:

- The top management of central government is exhorted to communicate the message to all staff that good construction procurement has a high priority.

- Departments are advised to organise their individual projects in order to: commit the whole body to its delivery; place resources and responsibilities for project delivery at the appropriate level (end-user); assign ownership to empowered individuals with short lines of communication to top management; improve transparency of costs and market-test in-house specialist support services. Furthermore, each department is required to review all projects with an out-turn cost exceeding £1 million, to establish whether each has clearly identified responsibilities and accountabilities assigned to an investment decision maker, project owner and project sponsor, and that communication lines between them are short. The principle appears to be that ownership carries responsibility and, therefore, commitment.

- Departments are required to co-ordinate their policies and initiatives on cross-departmental issues, particularly on best practice matters. This approach appears to be intended to

engender organisation-wide synergistic approaches where possible, while allowing for local control on appropriate areas of individual responsibility, such as planning construction procurement.

- Departments are requested to undertake risk management initiatives in order to raise the awareness of risks to clients on construction projects. Suitable procedures should then be introduced into capital works projects to facilitate more effective management of construction risks. The Scrutiny indicates particular concern for improved handling of contingency funding.

- Departments should raise the profile of government as a leading client by: using the best suppliers of goods and services; establishing tender procedures with aim of procuring those who offer the best service; advocating team-working, rather than adversarialism; standing firmly against unco-operative and adversarial people and suppliers; pursuing a dialogue with industry in order to reduce the potential for conflict within projects; discouraging the entrenched 'claims' culture; employing unambiguous contracts, stating how variations to be dealt with; seeking quicker settlement of contractual issues.

Limitations of the Proposals

Clearly the findings and recommendations of the Levene Report align with the those of Latham and *Setting New Standards*. Each of the initiatives recognises the increasing importance of procurement issues, the resultant need for government (with its regular high spend in construction) to become an 'intelligent' client, and that current performance is, on the whole, poor. Latham provided the impetus, paving the way for others to follow. It can be argued, that all of these major initiatives have a fundamental weakness, in terms of the methodology used to arrive at their conclusions. Because of this weakness, it is our view that solutions have been prescribed without any real understanding of the appropriate circumstances under which any of them can be successfully implemented.

The methodology used by the Latham Review was essentially, to consult the industry over its own problems, and ask what each separate interest group felt was necessary to effect improvement. The various view points were then amalgamated in order to formulate a consensus package for recovery. It was hoped, by this means, that all parties in the construction process would agree to the enactment of the total programme of recommendations and 'construct the team'. The problem is that, while this makes political sense, because it incorporates all interests, it does not provide any insight into who the winners and losers must be in the process if value for money is to be achieved. The methodology only works if it is possible to have a 'win-win' situation for all players in the construction industry. This is clearly a fanciful idea. Is it realistic to assume, therefore, that the self-interested and fragmented groups in the industry will fully support the whole package – especially if value for money means they lose some profitability?

Judging by the number of conferences and the amount of media exposure, since publication, the Latham Report would appear to have many supporters committed to change and to improving the performance of the industry. Despite this, and even though many of the recommendations put forward in the final report may have merits in their own right, the emerging evidence suggests that the review is unlikely to bring about the desired sustainable improvements. The main reasons for this conclusion are centred on the depth of proposed reforms; the validity of a 'consensus' style approach in identifying the industry's real problems and providing adequate solutions to them; as well as the ability of the industry to change its ways through self-regulation. These are explained below.

A survey of construction clients, consultants, contractors and sub-contractors, conducted by the authors in 1996,[11] found that the consensus approach was unlikely to provide any radical opinions or solutions. When each of the various industry groups were asked what they believed to be the real problems facing the industry, they were only able to identify issues directly impacting on their own performance: clients, therefore, stated that the adversarial culture and low productivity were the main problems; virtually all of the contractors surveyed claimed that culture and low profitability were of paramount importance; consultants were concerned with low

and discontinuous demand and profitability; and, sub-contractors were mainly worried about profitability and poor management. Interestingly enough, very few of the respondents from the supply side of the industry expressed the view that there was any problem associated with either productivity or the structure of the industry.

The survey methodology effectively mirrored the Latham approach, through its consultation with the existing industry participants. It was clear that this methodology resulted in the identification of a set of symptoms, but it did not provide a systematic analysis of the fundamental problems associated with the industry's fragmented structure, or provide any insight into the structural properties of the complex supply chains that constitute the construction industry as a whole. As such the methodology could only ever arrive at a listing of subjective anecdotes about perceived problems, rather than a scientific and objective analysis of the causes of misalignment in construction supply chains.

Similar reservations over the approach employed by Latham have also been aired recently by McDermott and Quinn.[12] They contend that the methodology lacked a theoretical focus, which could result in the problems faced by the industry being wrongly specified and only half-stated. Their major criticisms were that Latham concentrated on the issues identified by the vested interests within the industry, and that the consensus approach from within may have failed, even before implementation had begun. Unfortunately they did not provide a convincing theoretical methodology to allow a proper analysis to take place.

Concern regarding the depth of reform has also been recently expressed by others. Davis has alluded to the possibility that the Latham Report has not gone far enough when he compared the construction industry with an ailing human body. He stated *"...do you have confidence the entire body will leap into action and deliver 30% more efficiently? Much though I support 'Constructing the Team' and the implementation plan, I fear it won't - its blood has got so bad it needs an entire transfusion."*[13]

There is also growing evidence that the industry cannot agree to the enactment of the whole package and that the practice of 'cherry-picking', that so concerned Sir Michael at the outset, is beginning to drive. A prime example of this problem occurred with

the publication of the consultation document for legislation on fair contracts. Apart from the client groups, the industry reaction was reported to be 'overwhelmingly negative'.[14] The group that perhaps stands to benefit most from this legislation is the specialist/trades contractor sector, whose members presently suffer widespread mistreatment.[15] The Construction Liaison Group (CLG), representing this faction of the industry, has claimed that the Federation of Civil Engineering Contractors is only willing to accept proposals which benefit main contractors. CLG President, Tony Merricks, has called for a 'broader, less sectoral view', for the Review to work.[16]

The authors' survey also revealed a complete mis-match in perceptions on Latham, with each section of the industry unable to agree on how well other actors have received the recommendations. It is also clear that no single faction can be considered to be fully behind the total package of improvements.

Concern over the ability of the industry to accept the necessary change has also been raised in a recent survey conducted by Pilat UK, on behalf of National Power.[17] In the comments on the survey results, fear was expressed that the amount of cynicism and vested interests in the industry would not allow real change to take place. Only the larger 'blue chip' companies were considered to have sufficient resources to be able to influence and effect change.

The above evidence suggests that the process behind the Latham Report was fundamentally flawed. By consulting those with vested interests the Review has produced a set of recommendations which treat a number of individual symptoms, without addressing the fundamental cause of the industry's problems - the fragmented and dysfunctional structure which means that there can be no single treatment to deal with the difficulties that exist in the myriad of complex supply chains that make up the construction industry. It is also clear that the package of improvements will not gain the necessary consensus to provide for successful implementation.

That is not to say that the Report serves no purpose and should be discarded; it has at least raised the awareness of the industry's problems and the need for improvement. An agenda has been set, and there is now a need for extending the analysis to tackle the fundamental problem of industry and supply chain structure.

Relatedly, this problem of single prescription for a complex reality is also evident in *Setting New Standards* and the Levene Scrutiny. Each of these initiatives advocates the implementation of a number of functional strategies, such as risk management, without any guide for implementation or real thought as to when such approaches are appropriate in specific supply chain contexts.

For instance, by recommending market testing of in-house services, the Government is attempting to outsource professional support without any consideration of the strategic criticality of the competencies concerned, and whether it is actually appropriate to do so in specific supply chains and markets. This is a potentially dangerous recommendation move which could result in the loss of control of key aspects of the process, which could adversely affect value for money in the long-term. A more rigorous approach would be to critically analyse and establish which activities should be carried out in-house and which would be better provided by the external supply market within specific construction supply chains. It would then be a case of selecting the most appropriate relational forms for the delivery of services, rather than blindly following ideological drivers.

Benchmarking of 'best practices' is also recommended in each of these initiatives. Again, it can be argued that caution is necessary with the introduction of such an approach. Benchmarking practices in another sector of activity, or even across the construction industry, may not be appropriate for all aspects of government procurement. Benchmarking will only indicate what others are doing and not, necessarily, whether it is the appropriate thing for anyone else to do. The inappropriate application of benchmarked practices may therefore, ultimately lead to failure. 'Intelligent' benchmarking is necessary, in order to understand why, how and when given practices should be used, and what underpins successful implementation in specific supply chain contexts. Since construction is not one supply chain, but a series of distinct chains, with unique properties, organisations within the public and private sectors need to think through which practices they should be adopting to achieve their intended goals, within the context of their own organisation and these specific supply chain contexts. Treating construction procurement as if it operates within a single

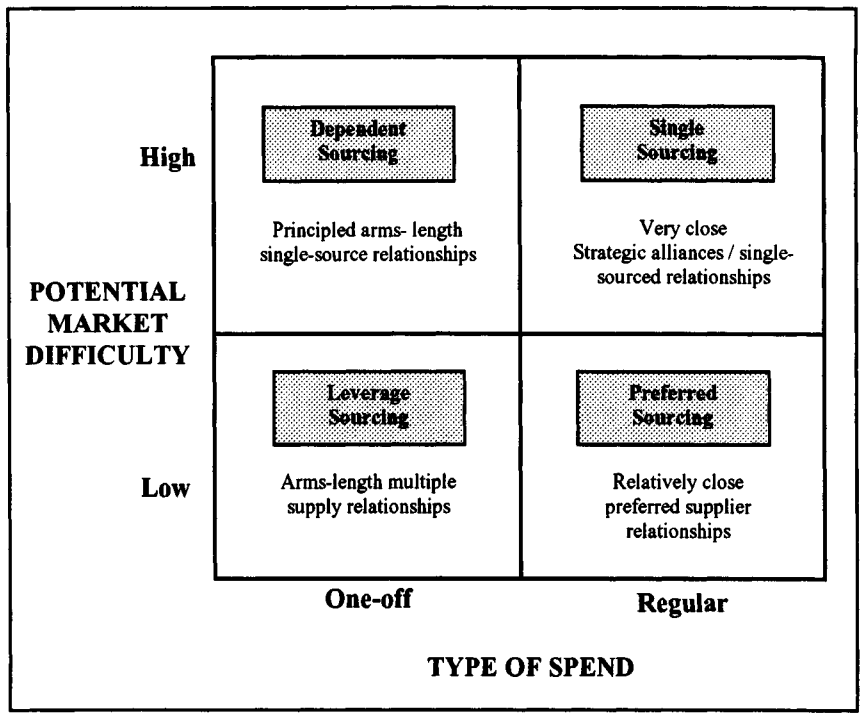
industry, with regular and standard properties, is clearly the most glaring weakness in these government supported initiatives. The second most important weakness is the recurring preference for collaboration and partnering solutions. The problem here is that the industry does not seem to understand that the correct way to think about construction procurement is to recognise that there are always a range of alternative procurement relationships available to deliver a particular construction project, and that it is not appropriate to assume that any one approach is always more appropriate than any other under all circumstances. This means that 'partnering' may be an extremely valuable way of managing construction procurement under some specific circumstances, but it may not be under others. The importance, for the effective management of construction procurement, of developing an awareness of the full range of tools and techniques available, as well as the contingent circumstances within which they must be implemented, is discussed in the next section.

The Need for a New Approach

As described in Chapter 1, traditional approaches to procurement, are essentially variations on a theme; they assume that each project is procured on an individual basis. They only differ in their apportionment of authority, responsibilities and risk. The vast majority of construction work currently undertaken is procured in this 'one-off' manner, with each party trying to extract maximum reward for minimum risk. Little thought is currently given to which forms of supply relationship are most appropriate in specific supply chains, and under particular circumstances, in order to best satisfy a client's construction needs.

Clients and their advisers currently using the traditional approaches to procurement, effectively apply a sourcing strategy that may be described as 'adversarial leverage'. Such arms-length supply relationships would normally only be suited to non-strategic, low-value, and infrequent purchases, where there is a great deal of choice from a market of expert and capable suppliers (i.e. a 'commodity spend'). Leverage sourcing is currently applied to all

Figure 3.1: Potential Procurement Strategies.



segments of construction, regardless of the type of spend and supply chain characteristics, and without any thought to the potential benefits that could be gained through the application of an approach based on the concept of appropriateness. Figure 3.1 illustrates the potential range of supply strategies that might be available if one was attempting to develop such a way of thinking.

Using the matrix in Figure 3.1 it is possible to begin to differentiate between various construction sourcing choices in relation to the 'regularity' of spend and the nature of 'choice' in the supply market. This approach begins to sensitise us to the fact that, far from there being only one 'best practice' way of managing construction procurement, there may well be a range of choices available, and dependent upon a host of specific contingent circumstances.

If clients segment their total schedule of construction requirements they can, using this methodology, begin to derive a

portfolio of procurement strategies. For areas of regular spend, where there are potentially many proficient suppliers to choose from, there is a possibility for longer-term supply relationships, perhaps in the form of 'preferred suppliers', or, if the suppliers are few in number, the need for close, long-term single sourcing ('partnering') may be required. For areas of one-off spend, there is still a place for more 'arms-length' and traditional relationships, although what form this will take will also depend on the number of suppliers available. This segmentation approach clearly helps the client to understand the conditions under which different relational strategies may be most appropriate. It also sensitises everyone in the construction supply chain to the types of competencies and relationships that the client requires.

There are today a number of construction clients, such as BAA, McDonalds and the Rover Group in the UK, who have begun to recognise that traditional approaches will not always satisfy their needs, and they have started to think about what is 'fit-for-their purpose'. The procurement strategies employed by such firms are explored in greater detail in Section B of this study because, it is clear from our research that these types of companies are developing 'better practice' in construction procurement. These approaches are not 'best practices' that every other company should slavishly follow, but sourcing strategies that are based on appropriateness and fit for purpose ways of thinking. Unfortunately, our research indicates that, at the moment, such enlightened clients are in the minority in the UK and elsewhere in the world.

Resolving the Problem: The Intelligent Client as Driver

It is our view, therefore, that the Latham Report was absolutely right when it stated that *'Clients are at the core of the process and their needs must be met by the industry'*.[18] The subtle relationship between client behaviour and industry structure would, however, appear to have been missed in the Report itself.

In determining their construction programmes clients effectively weigh up their needs for construction (and other investment),

against the short-term economic conditions in which they have to operate. Traditionally, the majority of UK clients (aided by a variety of professional advisers) and, irrespective of the regularity of their spend, have packaged their construction needs in a seemingly endless line of one-off projects, with a managed competition on each occasion to determine who will carry out each scheme. This behaviour has given rise to the short-term and reactive procurement strategies, already described, that have reinforced the cyclical and fragmented demand for construction. The supply side of the industry naturally has historically aligned itself in an opportunistic and reactive way to meet this fluctuating and disparate demand. Contractors in the UK, unlike in Japan have not been able to dictate how the industry is configured, they have only respond to what is asked of them.

While the Latham Report recognised the effect of this cyclical demand on the industry, it did not fully address the need for public and private clients to manage their demand more effectively. It is our view that the starting point for improvement has to be with clients and the effective management of their own construction procurement. In the end, however, it does not matter whether a client has regular or irregular spend for construction, what counts is that clients and construction professionals throughout the industry understand which form of external sourcing arrangements are the most appropriate for them to focus on under specific circumstances. In Section B we provide a series of case studies of companies that demonstrate varying degrees of understanding of the meaning of appropriateness.

Notes

[1] Latham, M. (1994) *Constructing the Team: Final Report of the Government/Industry Review of Procurement and Contractual Arrangements in the UK Construction Industry*, London: HMSO.
[2] White Paper Cm 2840 (1995) *Setting New Standards: A Strategy for Government Procurement*, London: HMSO.
[3] Efficiency Unit Cabinet Office (1995) *Construction Procurement by Government: An Efficiency Unit Scrutiny*, London: HMSO.
[4] Latham, M. (1995) 'Getting the Act Together', *Building* , 1 December.
[5] Latham, M. (1994) *op. cit.*

[6] Simms, N. (1995) 'A Main Contractors Point of View', in *Responding to Latham: the views of the construction team* (ed. S.L. Gruneberg), Englemere: CIOB.

[7] Latham, M. (1995) 'Latham – One Year On', *Purchasing and Supply Management*, October.

[8] *Ibid.*

[9] Latham, M. (1995) 'A Review of Progress and Developments', in *Responding to Latham: the views of the construction team* (ed. S.L. Gruneberg), Englemere: CIOB.

[10] Efficiency Unit Cabinet Office (1995) *op. cit.*

[11] Cox, A. and Townsend, M. (1996) *A Survey of Best Practice in the UK Construction Industry.* Working Paper No.1/96, Centre for Strategy and Procurement Management, University of Birmingham.

[12] McDermott, P. and Quinn, B. (1995) 'Latham Causes Conflict-Institutional Development in the UK Construction Industry', *Journal of Construction Procurement*, Vol. 1, No. 2.

[13] Davis, M. (1995) 'Achievements, Action Plans and How Clients can Help', *The Latham Implementation Plan Conference*, 25/26 October, Cabot Hall, London.

[14] New Civil Engineer (1995) 'News Analysis: Critical Phase', *NCE*, 25 May.

[15] Latham, M. (1994) *op. cit.*

[16] Millett, C. (1995) 'News: Specialists Accuse Civils of Undermining Latham', *Contract Journal*, 17 August.

[17] National Power (1996) *Constructing the Team: Results and Analysis of the Action Review '95 Survey*, Swindon: National Power.

[18] Latham, M. (1994) *op. cit.*

Section B:

Better Practice Case Studies in the Effective Management of Construction Procurement

Summary

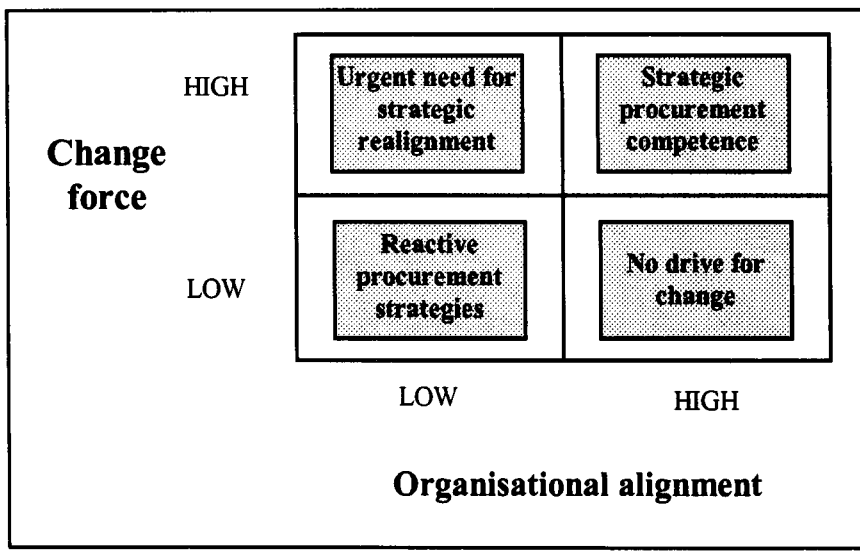
The main aim of this Section of the book is to examine the evidence emerging within the construction industry that some individuals and companies understand better than others the concept of appropriateness. In the pursuit of this objective a detailed analysis of the approaches employed by several major client organisations are presented, describing how they were able to engineer their respective construction supply chains to achieve improvements in value for money. This provides an analysis of the key factors influencing success and includes: the drivers for change; the methodologies employed; the rationale for key decisions made; and, the quantifiable benefits realised.

While there are many organisations exploring new ways of managing the procurement of their construction needs, it is not surprising that the best examples are normally to be found in those sectors of activity where the need for change is most urgent. The most pressing driver for change appears to be an increase in competitive forces within an industry. Where these are pressing, our research indicates that proactive organisations tend to question the validity of their existing procurement strategies. When existing practices are no longer delivering a competitive advantage to the business, it becomes obvious that there is an urgent need for strategic and tactical re-alignment. This gives credence to the old phrase that 'necessity is the mother of invention'. Figure B1 illustrates the relationship between the need for change, the existing alignment of procurement practices, and the normal organisational response to a variety of scenarios.

Not surprisingly, most of our case study examples are drawn from private sector companies that have historically found themselves in the top left hand box of the matrix in Figure B1. They are often companies that are experiencing an urgent need for realignment. Unfortunately, there does not yet appear to be much evidence in any of the countries studied of the emergence of such a strategic way of thinking in the public sector. This is not too surprising when one recognises that the drivers for change are usually less immediate in the public sector. As a result approaches to public procurement in construction tend to be based on more traditional ways of thinking.

While it is certainly the case that all governments are coming under increasing pressure to reduce public spending, current ways of thinking appear to be based primarily on ideologically-driven, market testing and outsourcing policies. These, it can be argued, are sub-optimal approaches to construction procurement. Despite the constraints public sector procurement operates under (such as the need for probity and accountability) it can be argued that there is considerable scope for improvement in the current way in which public sector construction spending is managed.[1] How this can be achieved is discussed later in this volume.

Figure B1: The Need for Change and Organisational Responses



While the public sector does not feature significantly as the proving ground for a 'fit for purpose' approach to construction procurement it is not true to argue that everything that is done by construction clients in the public sector is therefore inappropriate. As will be argued later, there are clearly many construction professionals in the public sector, just as there are in the private sector, who, by trial and error, have arrived at operationally appropriate ways of doing things. The key learning point here, however, is the fact that normally the public sector is insulated from those competitive pressures which *concentrate the mind* of private sector practitioners. Our case studies listed in Table B1, are, therefore, wholly drawn from private sector organisations in the UK, Japan and the USA. The cases have been selected, not because they are the only example of 'better practice' that our research has uncovered, but because they are examples of companies that have developed a clear strategic insight into the concept of supply chain appropriateness.

Table B1: Major Case Studies

Country	Client organisation	Main sector of activity	Main organisations in construction supply chain
UK	Rover Group	Automotive	SDC; Anglo Holt; Birse.
UK	McDonald's UK	Quick service restaurants	Yorkon; Britspace.
UK	BAA plc	Airports	AMEC Civil Engineering; Mace; etc.
UK	Gazeley Properties	Property development	Birse; Key Project Services; etc.
Japan	Shimizu	Construction	Kaneko; etc.
USA	Company X	Dynamic research based industry	Preferred supplier for design and construction.

Notes

[1] Cox A. (1995) 'Strategic Procurement Management in the Public and Private Sectors: The Relative Benefits of Competitive and Collaborative Approaches', in Lamming, R. and Cox A. (eds), *Strategic Procurement Management in the 1990s: Concepts and Cases*, Boston: Earlsgate Press.

Rover take s a fit-for-purpose view of supply relationships in the delivery of its construction programme

Chapter 4: The Rover Group: A Case of 'Fit for Purpose' Supply Relationships

Our research has demonstrated that of all the cases reviewed Rover appears to have the most thorough understanding of when, where and how to manage different forms of supply relationship to deliver its business objectives in construction in an efficient and effective way.

The Company

Rover Group is Britain's largest motor manufacturer, producing approximately half a million vehicles each year. The company has annual sales of £4,900 million and exports its vehicles to about one hundred countries world-wide. Export sales revenue exceeded £2,400 million in 1994. The major market areas are Western Europe, Japan, North America and Australia, with an increasing presence in Asia, South America, South Africa and the Pacific Rim. Rover directly employs 36,000 people in the UK and internationally, and supports a further 110,000 in the UK's manufacturing and retail/distribution sectors. The company spends approximately £3500 million annually on materials and services

bought from companies world-wide, but predominately from European sources.[1]

Many of the innovative procurement strategies and practices currently in place at Rover appear to have been influenced by lessons learned from their association with Honda in the 1980s. Honda acquired a 20% stake in Rover in 1989, following several years of collaboration and joint model development.[2] It would seem, however, that Rover has to thank Honda for more than an improved approach to procurement; it has been argued that the British company was actually saved by Honda's engineering and manufacturing skills, at a time when the company's future prospects were very poor indeed.[3] The relationship was not all 'one-way', as Honda also gained substantial benefits from the alliance. This strategy enabled Honda to overcome its weak market position in Europe, avoid import restrictions and become accepted as part of the UK industry.[4] Ownership changed again in 1994, when German auto manufacturer BMW bought the company. This move effectively ended the close alliance between Rover and its Japanese counterpart, although the Japanese influence is still very much apparent in the company.

Value Chain Positioning

It is clear that Rover's primary supply and value chains are involved with the production of motor vehicles. The company is currently divided into five main business units, and include the following:

- **Rover Body and Pressings** (Swindon): this unit is the main supplier of car body pressings to the Group, and also supplies body pressings to a number of external customers.

- **Large Cars** (Cowley): produces the executive car range, the Rover 600, 800 and MG RV8; it also has tool manufacture and body engineering capabilities.

- **Small/Medium Cars** (Longbridge): the company's largest facility, where the Rover 200, 400, MGF, Metro and Mini models are assembled.

- **Land Rover Vehicles** (Solihull): produces the full range of Land Rover models.

- **Powertrain** (Solihull and Longbridge): produces engines, transmissions, castings, and components.

An additional business unit, Group Design Engineering, is located at Gaydon in Warwickshire. Each of the separate business units was originally a separate company, for example, the Longbridge plant was previously Austin Motors. It is not our intention here to map-out the primary supply chain, but to focus on how the company's secondary and support supply chain of construction relates to the overall needs of the business. Only the factors which are associated with this process, and how the company developed its own strategic approach to construction procurement, are explored.

Construction and Business Needs

Rover has a variety of construction needs which support its core motor vehicle assembly business. These include the building of new manufacturing facilities and test centres, the extension and refurbishment of existing factories, as well as site maintenance. Expenditure on construction related work varies from year to year, depending on the business need. Under public ownership, the company suffered from a lack of investment in its existing facilities, and had few plans for new buildings and infrastructure. Construction expenditure has increased, however, since the take-over by BMW. The financial support for such investment has come from two directions: internally, the parent company places a higher priority on investment; and externally, the financial institutions are more willing to lend to Rover, with its perceived greater stability under the direction of BMW.

The company's construction spend can be broadly categorised under two headings: **capital** (including new-build and refurbishment) and **maintenance** (minor and routine repairs on existing facilities)

- **Capital Spend:** Quite logically, the requirement for capital construction expenditure on a particular site is determined and prioritised by the business need, which in turn is driven by the requirements of the vehicle programme. Rover has quite an extensive construction investment programme, currently in the region of £100 million each year, which mainly involves building and associated civil engineering works.

- **Maintenance Spend:** It is estimated that Rover spends millions of pounds on maintenance on each site, each year. Exactly how much is currently difficult to quantify, as records are sketchy and difficult to pull together from the individual sites concerned. Furthermore, the historical approach to maintenance procurement was largely reactive and uncoordinated. Rover is now attempting to rationalise its maintenance programme through a more strategic approach, involving *Facilities Management.*

Procurement Strategy

Rover Group evolved from a number of separate companies. Each company, and more recently business unit, had its own strategy for construction procurement, which meant that what little investment did take place, was fragmented and unco-ordinated. This reactive approach to procurement resulted in the group of companies accumulating a very large and diverse supply base. As the business units gradually grew together, however, strategic procurement issues were assigned to the central purchasing function, which developed an on-going strategy to reduce the costs of management of the cumbersome supply base.

The Facilities and General Services Purchasing Section, which carries out all construction procurement, inherited a supply base of approximately 12,000 firms. An immediate reduction of 6,000 was appropriate due to the fact that Rover had not conducted business with many of its listed suppliers for a considerable time. Targets for the subsequent reduction of the supply base were then set out in a rolling five-year 'Purchasing Quality Strategy'. Initially this was set at 20% reduction each year, until an optimum value was eventually

reached. The supply base currently stands at approximately 3500 firms.

In deriving its process for construction procurement, Rover applied its internal customer-led procurement philosophy, which had been adapted from Honda's system for purchasing car components. The aim was to satisfy several objectives, including: rationalising the supply base to reduce the costs of management; improve control and 'leverage' over suppliers; developing a programme for supplier appraisal and development; introducing a system of effective cost management; and, considering the outsourcing of non-critical maintenance activities.

Traditional Procurement

Capital construction works were traditionally procured through the single-stage selective tender route, with tenders sent out to between three and five contractors. Tender adjudication and award was not necessarily on the basis of lowest price; other factors were taken into account, including a technical appraisal and an assessment of past experience and performance.

Approximately 50% of the current capital construction programme is still procured in the 'traditional' way. It is still considered appropriate to use competitive tendering for situations where the level of spend for a particular type of work does not warrant Rover's effort and commitment in developing the suppliers, and where the supply market is not considered suitable.

A New Approach

During recent years, however, there has been a move away from conventional construction contracts in favour of longer-term, closer relationships.[5] Although *Partnering* appears to be the current 'buzz-word' used to describe long-term collaborative working relationships between client and contractor in construction, Rover prefers to describe its own approach as 'Effective Cost Management (ECM)/Supplier Partnership'. In reality this actually means that Rover has structured its construction procurement around a wide range of different approaches to construction supply management. These approaches include close single source and

preferred supplier relationships with contractors and construction professionals, as well as more arms-length competitive tendering relationships. Rover's approach places a considerable emphasis on the need for disciplined cost management, as well as supplier development, in satisfying its construction needs, but only when the supply chain characteristics and the nature of the construction spend make it appropriate to do so. The actual mechanics of this process, which focuses primarily on cost improvement, are explored in detail later in this volume in the chapter on *Strategic Cost Management*.

The true benefits of operating within such a philosophy can only be gained when dealing with suppliers who are of the right calibre. At present, Rover feels that the supply market is not sufficiently mature enough to rely 100% on this form of procurement. Some suppliers are not yet able to adapt to the cultural and management demands of this business philosophy; they are often too entrenched in the adversarial and opportunistic ethos associated with traditional construction procurement.

Rover has, therefore, concentrated its use of single source and preferred supplier relationships in strategic areas of procurement, in the knowledge that 80% of its total construction spend lies with approximately 20% of its supply base. Suppliers are assessed in terms of three categories of spend: (A) ***strategic suppliers***, who are awarded long-term arrangements, but normally only as preferred rather than single source suppliers; (B) ***non-strategic suppliers***, who are procured through more arms-length relationships; and (C) ***specialist suppliers***, who are also awarded long-term supply agreements, often on a single source basis. Initial selection for long-term supplier status is, therefore, purely on the basis of the volume and/or strategic importance of spend.

This approach has resulted in the company establishing the following supply relationships:

- single-sourced arrangements for facilities management (Drake and Scull);
- single-sourced arrangements for cost management (Yeoman and Edwards);

- preferred supplier status for architectural design services (Weedon Partnership);
- preferred contractors for building and civil engineering works (SDC, Anglo Holt and Birse); and
- arms-length contracts for low-value, non-strategic construction activities.

As can be seen, the key learning point from the Rover case is the fact that the company recognises that successful cost improvement must be achieved by a variety of methods rather than by an attachment to any one type of supply relationship. The concept of appropriateness is implicit in the way of thinking about effective leverage at Rover.

Drivers for Change

The main drivers for change at Rover, which encouraged this refocussing were the need for continuous improvements in cost, time and the level of service received, so that Rover could achieve its primary business objectives in an increasingly competitive global motor industry. The problem was that Rover had generally become disillusioned with talking to incompetent suppliers in the construction market place, who did not understand their need to develop a relational congruence with Rover, while the business case for its construction investment programme was coming under increasing pressure.

Rover felt that the level of service and expertise offered by the supply market was not to the standard it required for the construction and refurbishment of its strategically important facilities. The company needed contractors and designers who could provide more cost-effective and functional solutions with minimum impact on manufacturing operations. Conventional procurement options had failed to deliver, and Rover realised that it would have to develop the capabilities of its supply base in order for it to receive the innovative construction solutions that would ultimately support the success of its business.

In common with many other clients, the quality of construction work received by the car manufacturer had been erratic. This meant

that Rover recognised the need to work more closely with the supply base, to ensure that contractors of the right calibre were selected, who would develop the required expertise to satisfy Rover's ambitions.

Probably the chief driver acting on both the organisation's primary and secondary supply chains is the need for cost reduction. To be able to build and extend the facilities to support the principal activity of vehicle manufacture, Rover needed to reduce the cost of construction and achieve greater cost-certainty. So, how has Rover re-arranged its construction supply chains so as to deliver the intended benefits?

Construction Supply Chains at Rover

The supply chain for capital construction works has been re-configured to facilitate shorter lead-times and construction periods, as well providing greater cost certainty and scope for cost reduction. This has been achieved through a greater level of integration between the various players in the supply chain. In the process of investigating a specific business need or functional requirement, Rover brings the key players together at the earliest possible stage, to establish what is known as the 'core team'. Its members are selected on the basis of their potential for having a significant impact on the final project cost.

Initially, the core team must establish its structure, a suitable model for the flow of information, and an appropriate supplier selection strategy. Each scheme is approached on a 'fit-for-purpose' basis, establishing what competencies are required and enrolling the necessary functional areas as required. The core team is then responsible for driving the application of the Rovers system of 'Effective Cost Management' throughout the project.

This approach relies on Rover fully understanding its suppliers' costs in the achievement/improvement of a target cost, to ultimately effect the optimum business solution. The mechanics of this process are explored in detail in the chapter on Strategic Cost Management. The competence requirements for each project may vary, but typically the core team members will include the following parties, drawn from inside and outside the organisation:

Internal

- End User Area – facility requirements.
- Facility Engineers – facility requirements.
- Finance – financial / budgetary information.
- Purchasing – commercial aspects, supplier sourcing strategy.

External

- Cost Consultants – cost information and management.
- Principal Contractors – design and construction input, development of cost reduction opportunities.
- Specialist Consultants – design input.

Figure 4.1 illustrates Rover's supply chain for capital construction projects.

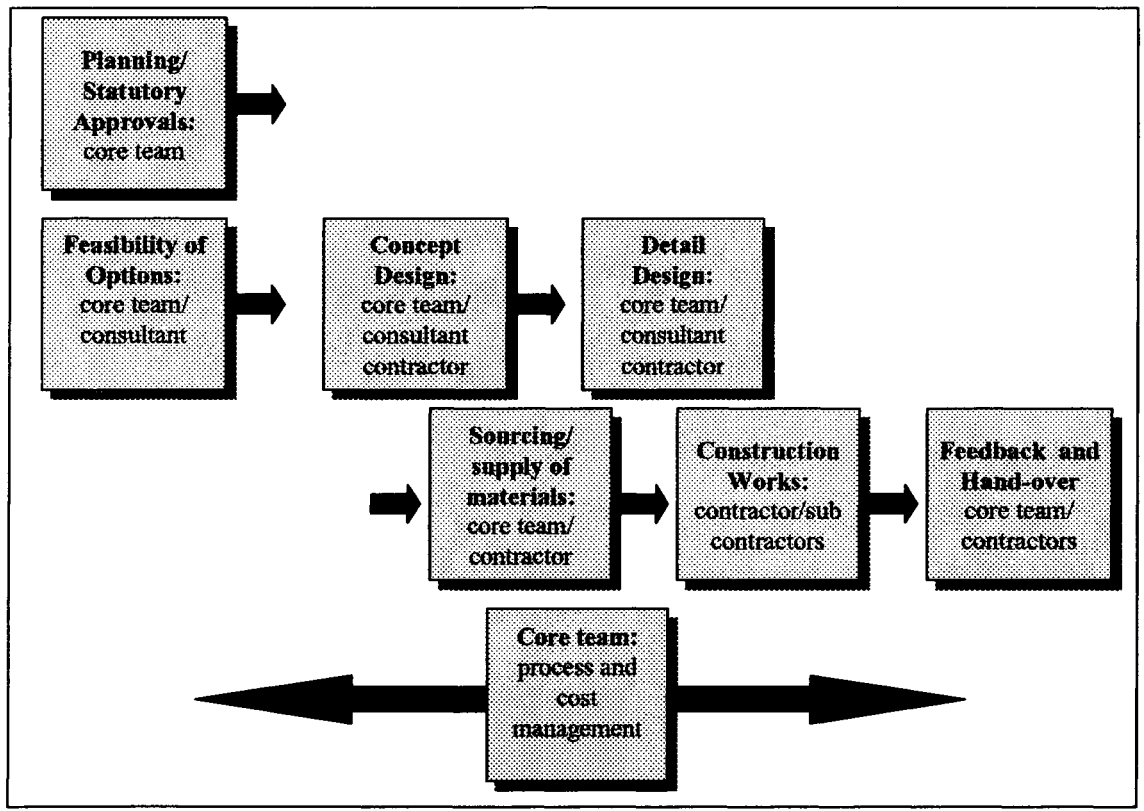
'Fit-for-Purpose' Relationships

In establishing its strategy for optimal supply relationships Rover has considered a number of factors, of which the most important are:

- Value and regularity of spend
- Strategic importance/criticality
- Supply market characteristics
- Dependency

Rover has recognised that it is in those areas in which it has regularity and a high volume of spend that the greatest scope for cost improvement, through the use of closer working relationships, exists. Greater efficiencies can clearly be gained through providing suitable firms with a regular work-load and by agreeing with them measures for improving performance. Rover has also recognised that those areas of its construction programme which have a significant impact on the business case and/or its production operations should be considered more carefully than other areas of its construction spend. If insufficient control is exerted over contractors, if companies of the right calibre are not employed, or if they lack sufficient understanding of Rover's

Figure 4.1: Rover's Construction Supply Chain (Capital Spend)



business and operational requirements, then the company knows that there could be disastrous consequences. Rover, therefore, accepts that strategic areas of procurement spend in construction must take place through closer supply relationships. It is probably fair to say that, in the Rover case, there is also a correlation between the strategic and high spend areas of construction procurement.

Supply market characteristics are also an important consideration for Rover. The company normally believes that, if there is plenty of choice amongst suitable firms then, all things being equal, the market should be competitively priced and the selection of a suitable firm should not be too difficult. Rover did not believe, however, that the current market for construction firms was sufficiently developed to satisfy its needs, and it was recognised that it would, therefore, have to work more closely with selected firms in order to develop the capabilities of the supply market. As part of its assessment programme, feedback was given to those firms that were not selected, with suggestions for improvements in areas of weakness. Suppliers who made the preferred list were enrolled in an on-going programme of improvement, known as 'RG 2000'. Interestingly enough, Rover found that the choice of suppliers in the relatively new facilities maintenance market was particularly limited.

A major concern in establishing any long-term supply relationships is dependency. Clearly, Rover has no wish to become too dependent on any one supplier, but the company is also concerned that its suppliers should not become purely dependent on work from Rover. The main fear is the possibility that a dependent supplier could be forced into bankruptcy if Rover experienced a major reduction in its own investment programme. This situation could also adversely affect the security of supply of goods/services to Rover. Furthermore, the company wishes its suppliers to gain experience and knowledge of better practices from working with other clients. The current and projected workloads of its contractors are, therefore, monitored to ensure that Rover projects are adequately resourced and that contractors are gaining work from other clients. Such potential over dependency is countered by a policy of spreading work across suitable firms. It is clear, as

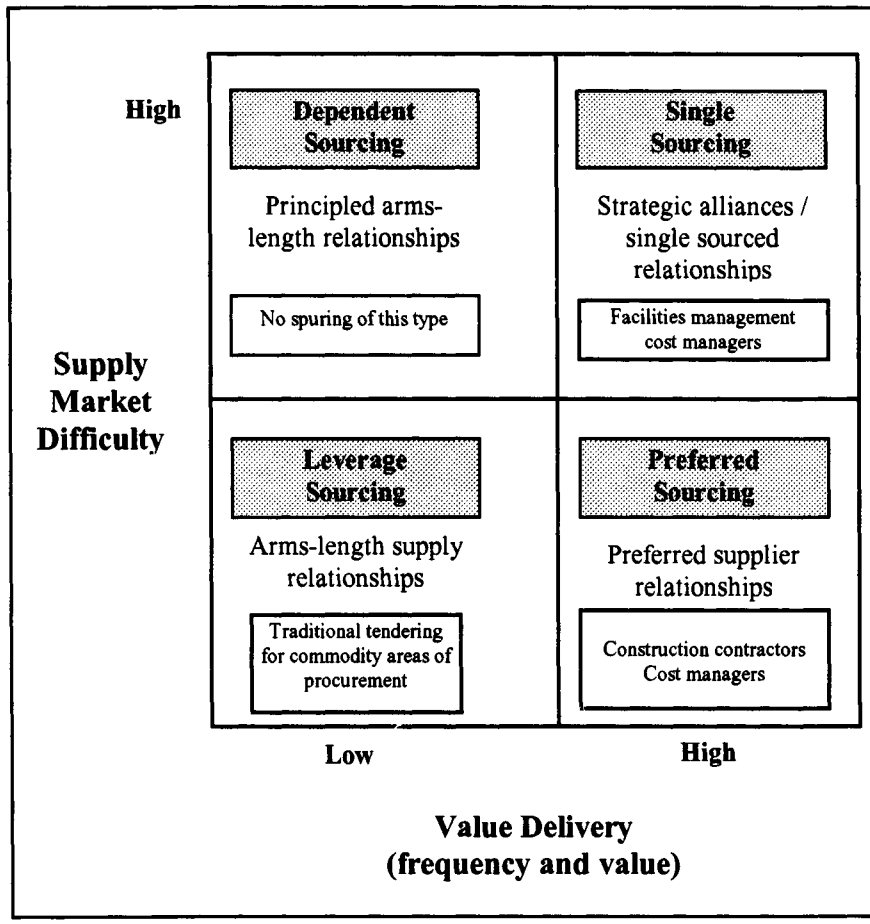
Figure 4.2 shows, that Rover uses a wider range of relationship and contract management strategies. Clearly, the company prefers to single source on a collaborative basis, but only when there is a unique competence. In general, however, Rover has not pursued an unthinking 'partnering' approach, but has selected preferred suppliers for strategically important areas of construction spend, in order to obtain a balance between operational control and supplier willingness to accept cost improvement targets.

Supplier Selection

So, which firms does Rover work with on its capital construction programme and what was the rationale for their selection? Two contractors were originally appointed to work under 'preferred contractor' arrangements on capital construction projects: SDC Builders Ltd of Bedford and Anglo Holt of West Bromwich. Rover did not want to be exposed to the dangers of single-sourcing, and considered that its capital programme would yield sufficient work for two medium-sized building firms. By the middle of 1995, however, it became clear that Rover's increasing investment plan would exceed the capacity of its preferred contractors. The selection process, therefore, led to the realisation of the need to find a third construction firm, in order to cope with the increasing workload, and to induce a degree of competition within its supply base.

Eight suitable companies were invited to make formal presentations to Rover, giving information on their experience of working in manufacturing environments, any partnering/open-book work, and their organisational culture. From this initial presentation, Rover established a short-list of three firms, which would undergo the full one-day 'RG 2000' supplier assessment. This led to the appointment of Birse Construction Ltd. Rover's system of supplier selection and development is described in greater detail later.

Figure 4.2: Rover's Construction Procurement Strategies



Relationship Management

In applying its philosophy to major construction works, Rover was wary of exposing itself to the obvious risks associated with single-sourcing; it did not want to become dependent on one supplier for such expensive and strategic facilities. Rover felt that although its approach meant close, long-term working, some form of leverage over its supply base would still be required. A competitive tension, created by using two or more partners, would reduce the danger of supplier complacency through the perception of being the sole source in perpetuity. The contractors (currently SDC, Anglo-Holt

and Birse) know that they have to perform relative to each other to keep their business with Rover, and they are wary of the possibility of new suppliers being introduced. Other, more sophisticated, mechanisms are also in place to ensure the performance of these supply relationships. The 'RG 2000' programme combines an actual assessment of performance with an on-going process for improvement in areas of current supplier weakness.

The total work load is distributed between the three firms by Rover. The primary motivation to perform well is provided by the potential continuity of work and, although the cost management system is geared towards reducing costs on projects, Rover does not feel there is a need to resort to sharing such savings with its suppliers. Rover understands that incentives for contractors may need to change, depending on market conditions. As circumstances change, Rover may need to offer more than regular turnover in order to retain the commitment of its preferred suppliers, who may otherwise be tempted to pursue more profitable projects with other clients.

The level of profit required by each firm is negotiated and agreed with Rover through its open-book policy. Each company may ultimately be reimbursed at different levels of profit, depending on what they and Rover consider is reasonable for the particular organisation and its specific re-investment needs. Rover, through its cost management consultants, has a knowledge of the current normal industry levels of profit, but does not attempt to abuse its position of power in the supply chain; it recognises that its suppliers should make a reasonable return in order to provide sufficient incentive to perform in the short-term, and to allow them to re-invest and aim for the continual improvement over the long-term that Rover requires.

The ultimate aim is for Rover to squeeze construction costs, not the margins of its suppliers. It is entirely possible, over a period of time, for suppliers to negotiate higher margins from Rover, as a reward for substantial cost efficiencies in the construction process. Obviously Rover will not bow to extortionate demands for profit, but as long as total costs are being reduced at a greater rate, then the company will be satisfied. This method of working was recently

attributed with facilitating a £200,000 CAD investment by Anglo Holt.[6]

Cost Managers (external consultants – Yeoman and Edwards) use comparative costing techniques to benchmark the costs of the preferred suppliers against the industry standards expected by Rover. This involves talking to other building companies to determine rates for particular types of work, as well as expected levels for overheads and profit.

Rover does not employ a traditional recognised form of contract for its construction works. Two small documents are used to manage the basis of the relationship between client and supplier: a partnership agreement, covering general responsibilities and requirements; and Rover's standard purchase order conditions. The partnership agreement was introduced merely to formalise the company's expectations of supplier performance, in the light of new preferred suppliers coming on-board.

Rover essentially wishes to work with suppliers of the right calibre and to indoctrinate these firms into its own way of thinking. It then relies on good management and trusts that once the right suppliers are in place they will perform to Rover's expectations. The rationale for this is that, once a company has understood and can operate within Rover's culture, there is little need for a contract to prescribe how each party should work together. The crucial question Rover's approach appears to be asking is "what is a contract really for and if the relationship is right, do you need one at all?"

The partnership agreement was drafted by cost consultants 'Yeoman and Edwards', based on simplified versions of standard industry forms of contract. There are only thirty-one fairly clear and concise clauses contained within the agreement, including: definitions; cost, time and performance criteria; management issues; insurances; terms of payment; and non-performance conditions. The final clause covers disputes, and is certainly the most interesting, as it typifies the expected relationship between the parties, with legal action considered the last resort:

The Parties will at all times co-operate fully in the operation of this Agreement. In the unlikely event of any dispute, both parties will enter into full, frank and open discussions with regard to any dispute with the intent of reaching a mutually amicable settlement, and will only exercise their option of taking legal proceedings in the event that such discussions are felt to be exhausted.[7]

A schedule of works is appended to the Partnership Agreement, which includes a list of the elements of work required on that scheme, along with their associated target construction costs, purchase order numbers, commencement and completion dates and insurances required.

To ensure the continued provision of a good quality service by its construction suppliers, Rover monitors and manages a 'human resource schedule' for each firm. Core and back-up staff are identified, categorised by primary job function, and whether they are currently working on Rover projects on a full-time, part-time, or non-Rover basis. This allows Rover to have an influence on the quality and competencies of supplier staff involved on its construction projects.

Benefits and Problems

Since the introduction of ECM Rover estimates that approximately 95% of its construction projects achieve or come in below the target cost. Of these, roughly half achieve net cost savings, allowing Rover to bring-forward its construction programme as necessary. It should be noted that prior to the introduction of the ECM system, about 50% of capital projects exceeded their budget. There are still a few projects which exceed the target cost (approximately 5%), and it would certainly make an interesting study to establish why this is so. Notwithstanding this, the discipline required to establish the target figure in the first instance, probably results in the target cost being lower than a traditionally produced pre-construction estimate in any case. The chief advantage of this system to any firm must be the greater cost certainty afforded. This system is also described in greater detail later.

It is quite clear that Rover has adopted a strategic approach to the procurement of its capital construction needs, and more recently to its facilities maintenance programme. The aims and objectives of this approach appear to be well understood, and there is evidence of success. It is self-evident, therefore, that Rover's approach is not about developing trust or looking for partnerships, even though the company uses the concept to describe what it is doing. In reality what the company is doing is effectively segmenting its spend in order to understand where it has opportunities to create a hierarchical structure of dominance and control over suppliers.[8] This is another way of saying that the company properly understands why, and when, it is appropriate to leverage willing suppliers through the creation of a coincidence of interest, which is ultimately controlled and managed by Rover, rather than by the suppliers.

One can readily understand why Rover has been able to achieve this in its capital and facilities management areas of construction spend. It is in these areas that the company has the necessary 'carrot' of regularity and volume in its spend to induce far-sighted suppliers to accept the potential 'stick' of the Rover cost management methodology. The competent supplier in this methodology is clearly the company that recognises that it must give up its attachment to opportunistic behaviour in favour of a more dependent "master-servant" relationship. It is to Rover's credit that it is able to understand when, and with whom, it is appropriate to attempt this way of working, and when it is not. This recognition of the appropriateness of specific supply relationships is the key learning point from the Rover case study.

Notes

[1] Rover Group (1995) *Facts and Figures*, Birmingham: Rover Group Public Affairs.

[2] Lamming R. (1993)*Beyond Partnership: strategies for innovation and lean supply*, Hemel Hempstead: Prentice Hall.

[3] Hamel G. and Prahalad C.K. (1994) *Competing for the Future*, New York: Harvard Business Press.

[4] Womack J.P., Jones D.T. and Roos D. (1990) *The Machine that Changed the World*, New York: Rawson Associates.

[5] Building Services (1995) *Hush Rover: Project Update*, April.

[6] Building (1996) *Getting into Gear*, 6 December.

[7] Extract from 'Rover's Partnership Agreement' document, February, 1996.

[8] This is a key learning point discussed more fully in Andrew Cox (1997) *Business Success*, Boston, UK: Earlsgate Press.

Chapter 5: McDonald's Restaurants Ltd: Lead-Time Reduction Through Standardisation and Modularisation

This is a case of business improvement through re-engineering the construction supply chain, focusing on standardisation and modularisation of the building product. This has been achieved through rationalisation and development of the supply base, using preferred supplier relationships. The major benefit has been lead-time rather than cost reduction.

The Company

McDonald's Restaurants Ltd. is currently the main player in the UK quick service restaurant (QSR) market. With a turnover in the region of £720 million in 1994, the company currently retains a market share of approximately 70%. McDonald's UK employs over 33,000 people directly, and at least another 5,000 through franchises.[1] The largest rivals are considered to be 'Burger King' and 'KFC', but there is also an extensive number of small players

who account for a sizeable proportion of the market, including chip shops, burger vans and other take-away food outlets.

McDonald's corporate headquarters are based in Oak Brook, Chicago. This forms the reporting centre for its international operations, which now has a presence in 73 countries. Each business unit appears to have a high degree of autonomy and freedom to act within the organisation's structure, although supported by a strong pool of corporate resources. Within the UK, operations are directed from East Finchley in North London, and through a range of regional offices.

The culture at McDonald's may be described as global. The companies in each country are not just concerned with their own environments, but are interested in sharing problems and experiences across the business. The company may be described as a 'learning organisation' with its emphasis on teamwork, shared learning, continuous improvement, communication and R&D. The whole organisation is also directed with a strong customer-focus.

By the end of 1994, McDonald's had opened 577 restaurants in the UK, representing a total investment in property of £970 million.[2] The company's current business strategies are aimed towards consolidating and expanding its market-share and, ultimately, to the domination of the QSR market place. To achieve this goal, the company has embarked on a significant programme of new restaurant construction, involving the erection of new free-standing facilities and the 'fitting-out' of existing premises.

The corporation has experience of building across many countries, which allows individual companies within the group to draw on a considerable bank of expertise and knowledge. If a new initiative is developed in one country, the information is shared and the rest of the corporation can learn and improve. This is certainly evident with the development of 'modular construction' by the UK division, in which it considers itself to be ahead of the construction industry anywhere in the world. This innovation, which has been based on re-engineering its construction supply chain so that it provides a cost reducing and value for money solution for the company, is now being shared with the rest of the corporation.

Value Chain Positioning

Clearly the company's core business activity and, therefore, the primary supply/value chain is the provision of quick service food. Construction is effectively a secondary supply chain, although the company has recognised the complementary importance of this activity in achieving its overall business objectives. By employing a more strategic approach to construction procurement, based on cost reduction and speed to market, McDonald's has been able to increase its long-term expansion programme in the pursuit of its overall business goal of market domination.

As with the other case studies, it is not intended to analyse the primary supply chain here, but to focus on McDonald's position on its construction supply chain and to describe how it has established a more effective approach to procurement.

Construction and Business Needs

McDonald's programme of new restaurant construction is a key part of its current business aims of consolidating and expanding market-share, and ultimately dominating the QSR market place.

The construction programme for its core business currently consists of one hundred 'new build' (free-standing) restaurants and refurbishments (fit-outs of existing premises) each year. The approximate split between these two areas is 70–80% for the former and 20–30% for the latter. The total construction cost of each 'new build' is estimated to be in the region of £4–500,000. To achieve its expansion programme, however, the rate of delivery of new restaurants is required to increase rapidly during the next five years.

Procurement Strategy

Traditional Procurement

Historically, McDonald's approach to construction procurement was based on the traditional rigid separation of design and construction. The lack of integration and business focus which this created, linked with poor communication through the supply chain,

led to inefficient designs and poor performance in terms of construction time and cost.

All design work was carried out by consultants. The poor level of direction of such firms, however, resulted in inefficient space planning. In some cases restaurant areas were over-designed by up to 40%. In building its facilities larger than was necessary the construction cost per 'cover' was seen to be at an unsustainable level, which adversely affected the business case for new facilities. In addition to this problem, a lack of marketing input into the construction process led to a lack of appreciation of what the customer really needed and wanted. This was exacerbated by poor communication between designers and end-users. McDonald's in the UK realised that this situation was unacceptable and that change was necessary.

A New Approach

To achieve its desired programme of expansion McDonald's realised that it needed to improve the effectiveness of its construction process. There were two main issues: time and cost. Most importantly, the company needed to reduce the unit construction time to facilitate the required 'speed to market' for its new restaurants. It also required a reduction in unit costs, so as to be able to build more outlets for the available capital expenditure.

A great deal of effort was, therefore, put into improving the efficiency of the process, through an increase in the use of standard, modular components. The details of the modular approach are described later. Essentially, what started out as a purely 'technical' innovation soon led to a more innovative approach, based on the complete re-engineering of the companies construction supply chain. In order to develop the modular approach, McDonald's was forced to challenge the way in which it procured its buildings, and how its internal and external supply chains were configured to deliver the intended benefits. The company effectively questioned its position on the construction value chain, re-appraised the activities it needed to carry out, and where the efficient boundary of the firm should be.

It rapidly became apparent, as the company analysed the criticality of particular construction activities and processes, that it might not be appropriate to carry out all design work in-house. The company decided that while direct control over the expertise in the strategically important area of concept design should be retained, some of the more mundane and technical details could be more efficiently provided by specialist suppliers, on an *ad-hoc* basis.

Similarly, the company decided that it did not want the burden of organising competitive tenders for every construction project. McDonald's felt that this traditional approach was too costly, time consuming and, more importantly, could not deliver the innovative product required to satisfy its business case. The consequence of this way of thinking was that closer relationships with suitable firms were seen to be necessary in order to generate the desired flexibility, economies of scale and scope for continuous improvement. The company recognised, however, that it would also have to find a suitable mechanism to ensure value for money now that competitive tendering was to be rejected as the basis of construction sourcing.

In questioning the type of relationships it required with its construction supply base McDonald's had to consider whether or not a higher degree of vertical integration would be appropriate. In the end it was decided that insourcing would be required for concept design and the management of the development process, while outsourcing was appropriate for detail design work, module manufacture and the supply of services/fittings. The company recognised, however, that it would have to work with and develop the right calibre of suppliers, to ensure the success of its re-engineering initiative.

Construction Supply Chain

Using the 'modular' approach, McDonald's has effectively compressed the construction time for its restaurants on two levels. Firstly, the amount of standardisation in design now allows a greater degree of overlap between the design and construction phases, as only site/restaurant specific factors require bespoke design details. Secondly, the repetitious use of standardised

modules provides for efficient production, with minimum time required for on-site work. In configuring the supply chain in this manner, however, the company has been forced to consider the most appropriate forms of supply relationships to deliver the finished product and ensure a lean process.

Approximately 50% of the cost of a McDonald's restaurant may be attributed to the construction activity carried out by the constructor (or the 'assembler'). The remaining 50% is in the direct issue of standardised pre-sourced materials and services. McDonald's has divided the construction supply chain between the site-enabling/infrastructure works, the supply of its standard components, and the erection of the building units. The rationale for this division of work is based on the need to align construction needs with the structure of the supply markets. The supply chain to bring about the McDonald's construction process is illustrated conceptually in Figure 5.1.

'Fit-for-Purpose' Relationships

In re-engineering its supply chain, it is clear that McDonald's approach was based on understanding which of the universe of possible relationship management options would be the most appropriate to allow the company to control each of the competencies in its construction process in the most efficient manner possible. A number of factors were considered in this strategic decision process, including: the need for control; the ability to innovate; and the efficiency of transactions. The company has established a range of 'fit-for-purpose' external supply relationships, including: two 'alliance' contractors for the development and construction of modular buildings (Yorkon and Britspace); a single-source supplier for statutory approvals/development advice; and a series of preferred suppliers for detail design, restaurant 'components' and site/infrastructure works.

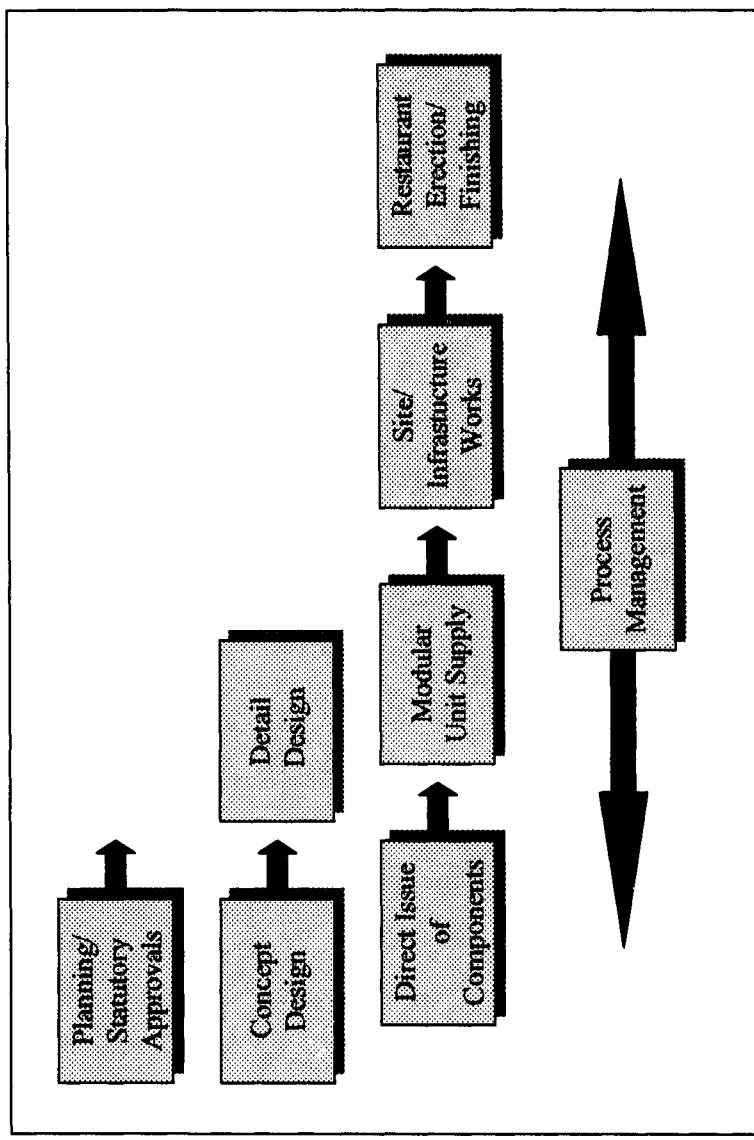


Figure 5.1: McDonalds' 'Process' Approach to Restaurant Construction (Supply Chain)

McDonald's had neither the expertise nor the desire to undertake the development and supply of the pre-fabricated restaurant modules in-house. The success of this innovation, however, was critical to the overall success of its expansion programme, and so very close relationships with appropriate specialist suppliers were recognised to be essential.

In the case of 'planning and statutory approvals', it was decided that such a service was an important complementary skill, but one that could be bought on an *ad-hoc* basis, albeit from an expert (single sourced) organisation that understood what McDonald's was trying to achieve.

Control over 'concept design' is maintained in-house, because the critical asset for the company is its brand image. 'Detail design' is not considered to be as critical. As a result, this competence is outsourced and controlled through the principles set out in the concept design, using McDonald's specifications and accepted codes of practice. As there is a wide choice of suitably qualified sources in the supply market, McDonald's recognised that this competence is effectively a commodity, which because of its low criticality can be safely outsourced. McDonald's have, however, rationalised their supply base and tend to rely on preferred suppliers for this competence, rather than on arms-length competitive tendering.

The site enabling and infrastructure works are also highly important to the construction process. This is because, unless foundations and ancillary works are completed quickly and ready to accept the erection of modules, valuable time can be lost in the process. Given this it was decided that preferred suppliers would be required to undertake this service. The actual erection of the modules is considered to be a relatively low-skilled exercise, which can be carried out either by the same firms that provide the infrastructure works, or indeed by the module suppliers themselves. The overall management of the construction process, (including design development, supplier management and development, and project and cost management) is considered to be highly critical. Control of this core competence, therefore, is retained in-house.

McDonald's has also made a major innovation in relation to the procurement of its ground works; it has invested in a piling rig for

the production of standardised foundations. The rig, maintained by Roger Bullivant Ltd, is used exclusively for McDonald's projects, travelling from site to site with all equipment needed, including a mobile concrete batching unit. The piling operation for a restaurant can be completed in only half a day, although adequate curing time is required before the foundations can receive their final loading.

The restaurant buildings are essentially light structures (approximately 75 tonnes) and, therefore, only a relatively low load has to be transferred to the sub-strata. This provides the scope for standard foundations to be applied to all sites, regardless of ground conditions. This means that foundations may be effectively over-designed for some sites and, in theory, more expensive. This is balanced out, however, by the efficiencies that are gained through the repetitive use of a standardised process. The chief advantages of this approach are faster site operations and response times, and greater certainty in cost management. Foundations for restaurant extensions can also be produced more cheaply. To ensure the continuing efficiency of this approach, however, the company has to maintain a high utility from its plant.

The direct supply of components includes materials such as electrical items, etc. Such items are procured centrally by McDonald's in order to maintain control over the quality and availability of supplies, and to gain better discounts on the volume of orders. These items are then issued directly to the module assembly factories.

Contractor/Supplier Sourcing

Initially, McDonald's developed the modular process with Britspace. It only moved to develop a second supplier, Yorkon, to remove the risks associated with single-sourcing, after gaining confidence in the success of its innovative approach, and as the business case required an increase in the capacity of its construction output. The two firms effectively produce the same product, a rigid steel box, although by different processes; Britspace bolts its steel sections together, while Yorkon uses welding.

Both Britspace and Yorkon are located in Yorkshire. One of the reasons for selecting suppliers in this location was the lower cost of

labour in the North East. That is not to say that McDonald's believes in sourcing firms with poorly paid employees; but it does wish to pay reasonable rates for a stable and productive work force and not incur excessive premiums, as can be the case in Southern England. Furthermore, as the development plan covers the whole country, it is more logistically efficient to produce the modular units as centrally as possible and minimise the impact of delivery costs.

The process for selection of the module suppliers was rigorous, involving formal interviews and presentations as well as prolonged negotiations. The company also has standing lists of approved firms, organised on a regional basis, for ground works, site-enabling/infrastructure works, etc. Suitable firms are selected on the basis of cost, experience, recent track-record, attitude and flexibility. Two or three firms are on the approved list in any one region, although rotation of existing and new suppliers will occur, depending upon performance.

McDonald's has a detailed knowledge of the standard rates for its construction works, through cost models produced by in-house managers, fed by regional and central construction staff. It is, therefore, able to procure the various packages of construction work using the leverage of its regular, process spend, allied with the detailed knowledge of its supply cost structures.

Relationship Management

It is clear that McDonald's has established a procurement strategy that embraces closer working relationships with its construction supply base for its regular/strategic areas of spend. This is particularly the case with module suppliers, electrical and plumbing contractors, and kitchen-fitting companies. These relationships are characterised by attributes such as: an open and honest approach; performance specifications (although the actual process of delivery is not prescribed); and the encouragement of innovation, to allow McDonald's to 'plug' into ideas and opportunities for improvement.

There are no formal conventional construction contracts governing the relationship between McDonald's and the module

suppliers or its construction firms; the company merely issues a purchase order incorporating its standard terms and conditions.

Benefits and Problems

Since the implementation of its construction strategy McDonald's has successfully delivered over 200 new restaurants without any major problems. Although McDonald's considers that its modular approach is not yet perfect, it has still managed to realise a number of important benefits, including:

- The speed of construction has rapidly increased, from twenty-seven weeks in 1986 to only 36 days per restaurant. The record is currently nine days. This allows the company to achieve its rapid expansion programme, as well as facilitating earlier cash flow from its new restaurants.

- The level of construction spend is more predictable. The greater certainty of cash flow is particularly beneficial to the business as a whole.

- McDonald's has been monitoring the repair and maintenance costs of its modular buildings, the earliest of which have been in place for the last three years. Results indicate savings of 50% compared with running costs for their traditional buildings.

- By reducing the need for skilled labour, such as qualified brick-layers, a greater level of site productivity can be achieved.

- Waste in site labour and materials has been reduced to significantly lower levels, significantly reducing non-value added costs.

- Consistent quality is achieved, with less 'snagging' required.

- Pre-fabricated modules are guaranteed by suppliers that no major work will be required for the duration of their design life (25 years).

There are also other, less obvious benefits. The modular system provides facilities which are highly adaptable. For instance, expansion and/or refurbishment may be achieved in a fast, clean operation involving minimum disruption to restaurant operations. The pre-fabricated modules may be readily detached from the front of the building if the company wishes to expand a restaurant's seating capacity. The procedure commences with the removal of the front section of roof, then lifting the front 'box' clear, dropping in a new section, and replacing the roof module. This relatively simple approach has been used successfully throughout the UK. The entire operation is carried out over-night. For example, 48 seats were added to the Nene Park restaurant in Northampton, the entire operation was completed in a period of only 18 hours. Using traditional construction techniques, the exercise would have taken approximately two weeks.

A major benefit to the contractors and suppliers concerned is that they are able to achieve consistent and reasonable (although not extortionate) levels of profit, rather than the 'peaks and troughs' usually associated with the construction industry. Again, predictability of cash flow is important for any business. An indirect benefit is that they will have developed a level of expertise that should increase their competitive advantage with other clients or in other markets.

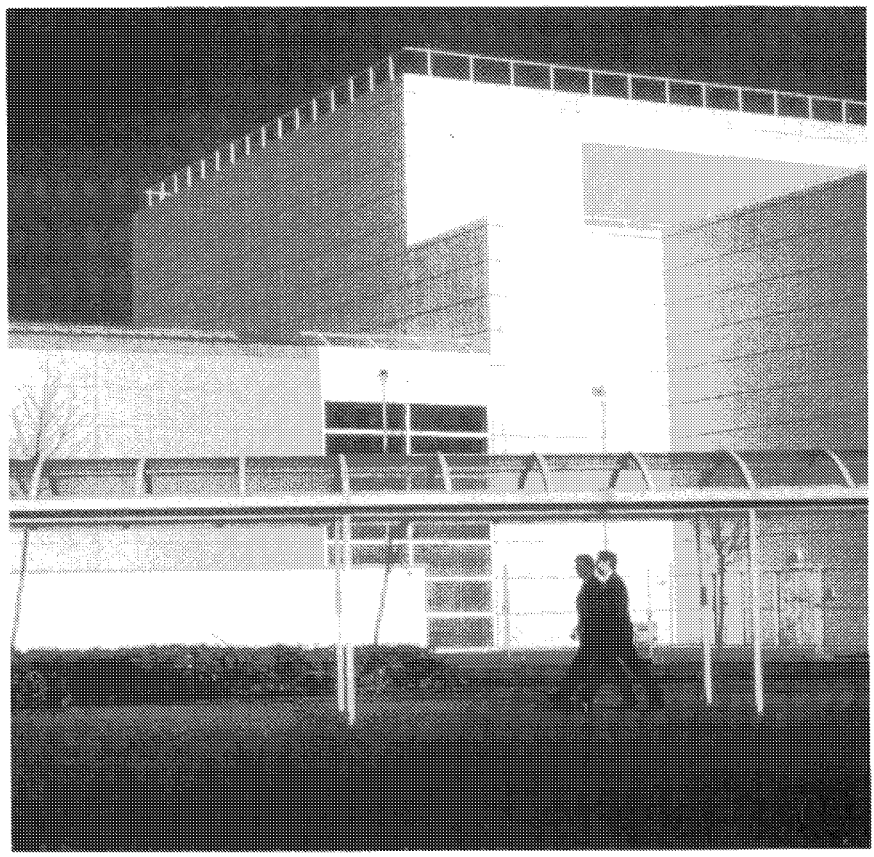
As would be expected some teething problems were experienced in the move away from a project-based construction process towards one focused on a standardised and modular 'manufacturing' process. A learning curve was experienced by all parties, as relationships were built, processes were learned, and systems were adapted. Interestingly enough, however, despite the various benefits associated with the modular approach, the average cost of construction has not reduced appreciably. The initial priority was the speed of development, but McDonald's continues to look to reducing costs. One initiative in this area is to standardise the modules provided by the different suppliers. This will allow a greater interchangeability of the most economic building components.

Once again the McDonald's case demonstrates the benefits that can flow to a company if it is able to focus on what is of critical

importance to the business, and what is the appropriate thing to do to achieve an increase in performance. While the McDonald's case does not reveal significant cost reduction from its innovative re-engineering of the construction supply chain, it is clear that the benefits to the business from speed to market must have had a considerable impact on cash flow, market share and profitability. McDonald's has been able to re-engineer it supply chain from a project to a manufacturing process. It is important to recognise, however, that not every company is in a position to achieve what has been done at McDonald's. The key learning point here is not that modularisation and manufacturing processes are the key to construction efficiency, but that they can be for specific companies under particular circumstances. We will explore the appropriateness of this approach in the chapter on Standardisation and Modularisation.

Notes

[1] McDonald's Restaurants Ltd. (1995), *Fact File.*
[2] *Ibid.*



BAA is attempting to drive change through the industry

Chapter 6: BAA: The Pro-active Re-engineering of Construction Supply Chains

BAA is currently re-engineering its approach to managing its construction procurement around a focus on specific supply chains, for which it has a regular spend. It is attempting to do what is appropriate to deliver cost and time reduction so that it can afford the expansion of its facilities to compete in the world transportation market. Although many strategies are in their infancy, significant benefits have already been delivered in the production of runway pavements.

The Company and its Sector

BAA is the world's largest privatised international airport operator and owns and operates seven airports in the UK: Heathrow; Gatwick; Stanstead; Glasgow; Edinburgh; Aberdeen; and Southampton. These range in size from a small regional facility (handling less than one million passengers per annum) at Southampton, to Heathrow, the world's busiest international airport (52.1 million passengers in 1993/94). BAA caters for approximately 71% of all UK passenger traffic (over 87.9 million passengers per annum) and 81% of air cargo. In addition, the company manages the shops and restaurants at Pittsburgh Airport in the USA and acts as consultant and adviser to governments and airport operators across the world.

Established in 1965 as British Airports Authority, BAA underwent privatisation in 1987 and now has a turnover in excess of £1100 million. Profits are made in three main areas: **Airports** (landing fees and other airport charges levied on the airlines), **Retail** (shops and restaurants yield an increasing revenue from passengers) and **Property** (rental income from airport property assets). Most of BAA's income is, however, generated from its retail activities (44.3%).[1]

BAA considers itself to be a customer-driven business, constantly improving the cost and quality of its services and the productivity of its employees. This is reflected in its mission statement *".....to make BAA the most successful airport company in the world, by always focusing on customer needs and safety, seeking continuous improvement in the cost and quality of its services, and enabling its employees to give of their best."*[2]

BAA operates in a regulator-induced competitive market. The market is a near monopoly, so far as the UK is concerned; BAA has a passenger market share of 71% and a freight market share of 81%. Its nearest competitors are the municipally owned airports of Manchester and Birmingham International. BAA's monopolistic position is clearly indicated by the company's control of the two major airports in the South East (Gatwick and Heathrow). These two facilities alone account for approximately 60% of passenger traffic in the UK, and offer the primary point of entry into the UK for most international air traffic. BAA is, therefore, regulated to ensure that it does not abuse its market position.

BAA does consider, however, that it is facing increasing international competition in the airports sector. The effects of globalisation mean that all the world's major business and holiday locations are competing with each other to attract customers. This too will have an impact upon the airports serving these locations; growing business and tourist areas will see a corresponding growth in air passenger traffic. BAA is, therefore, in competition with all other international airports to provide the best value for money facilities to its primary customers (the airlines) and its indirect customers (the passengers and freight firms).

Value Chain Positioning

BAA's primary supply chain is the logistical transfer of passengers, from airport-entry to take-off. The airport operator's current position on this supply chain primarily involves the provision of airport facilities for the major airlines, to enable fast, efficient and pleasant passenger transfer. This is a very dynamic market place, with airlines constantly changing the mix and size of aircraft, as well as the facilities required for their passengers. In providing its facilities, BAA is also involved in a number of secondary, but highly complementary, supply chains, including construction and property management. The primary supply chain is complex, although it is not our intention to map-out this process, but to consider how construction relates to the overall needs of the business, and how BAA has sought to improve the management of its construction supply chains.

Construction and Business Needs

Construction is an activity which supports the business process, but is not an 'end' in itself. The company currently spends in the region of £480 million each year on construction. In order to remain competitive, the airport operator must constantly improve the capacity and standard of its facilities.

Although BAA does not presently differentiate between its various types of construction work (it is all labelled as construction), it can be segmented as follows: new build; extension and modification; pavements and infrastructure; and, maintenance. Each category of construction work has different business requirements driving its need:

- **New Build:** This includes the provision of new terminal, commercial and office buildings. The business need may be driven by increased passenger traffic, by new commercial opportunities, or perhaps by the replacement of obsolete facilities.

- **Extension/Modification:** Such work may be required to upgrade existing buildings, driven by a need to cater for additional retail, office and passenger demand.

- **Pavements/Infrastructure:** The construction of runway pavements, aircraft stands, taxi-ways and general infrastructure may be driven by the need to cater for additional traffic, safety requirements, or operational efficiency.

- **Maintenance:** The need for repairs and upgrades may be driven by safety requirements or operational efficiency.

The total expenditure on construction work can vary from year to year, depending on the size of the capital investment programme, but it is currently in the region of £480 million each year.

Procurement Strategies

Historically the procurement route chosen by BAA for each category of construction work has varied, depending on the specific technical and business drivers involved. BAA is clearly in the business of moving passengers efficiently from airport-entry to take-off. It has always been recognised that, because of this, the chosen procurement system must always ensure that disruption is kept to a minimum on projects involving 'live' facilities, such as the extension, refurbishment or maintenance of terminal buildings. A high degree of team integration and client control is required in such cases. This renders a design and build approach totally unsuitable, because it is felt that the contractor would be too divorced from BAA's operational requirements. If customers experience a poor service and environment, BAA's business will ultimately suffer. The appropriate selection of procurement route and suitable players in the process is, therefore, critical.

Most of BAA's construction workload (in terms of value) falls within the categories affected by day-to-day operations. The usual approach employed for such projects has, therefore, been the construction management route, as this achieves a high level of integration and co-ordination between the design and construction

teams, leading to more efficient construction operations. Potential problems can also be ironed-out at the earliest stage possible. Design and build has been however, the normal option chosen for new-build projects, where operational requirements are not as much of a problem. On the other hand, maintenance work is currently carried out by a mixture of direct labour and term contractors.

Traditional Procurement

BAA has normally used traditional forms of contract for the employment of main contractors (JCT, ICE, etc.). Historically, these were amended heavily in favour of the client. There is now a drive to use standard forms, in their unamended state, with a fairer allocation of risk between employer and contractor.

Consultants were often contracted on very informal arrangements, with the duties and scope of their work often poorly defined. The budget for such activities was not considered in detail. Arrangements are now more rigorous, with clearer roles, responsibilities and requirements detailed in standard conditions of engagement.

Historically, the attitude to cost management at BAA was one of 'this is my budget and I will spend up to that amount'. There were no suitable mechanisms or incentives for cost reduction. BAA is currently developing a strategy for standardising the procurement process, which includes the need for consistency of costing. This involves striving for greater certainty of out turn costs, and emphasis on life-cycle costings.

Prior to privatisation, although not necessarily commercially sound, a structured format for cost management did exist. This involved the collection and up-keep of data for all BAA facilities, including floor areas, costs, etc. Following privatisation, performance related pay was introduced for staff, which obviously meant that greater emphasis was placed on those tasks which were 'measured'. Consequently, non-essential items of work, such as the maintenance of the cost system, were postponed.

BAA is now trying to develop a new effective system for cost management. Cost consultants have been used occasionally, but not

many understand the airport environment or its operational requirements.

A New Approach

Despite the historic recognition of the need for a differentiated approach to construction procurement described earlier, it was clear to senior managers at BAA that this alone was an inadequate basis for the significant improvement in performance that was necessary for what was now a privately owned company, facing shareholder and regulatory pressures for efficiency and profitability. Given this, in recent years, BAA has developed a more proactive approach to construction procurement. This approach has focused on five main areas of activity:

- Standardisation of project process – all projects now follow the standard BAA process, to ensure consistency in project control and delivery;

- Rationalisation of supply bases – to achieve real gains, BAA wishes to work more closely with a smaller number of carefully selected suppliers in the achievement of lower costs, improved safety, productivity and quality;

- Standardisation of components – to reduce risks and unit costs without compromising on the quality of design;

- Modular construction – using pre-fabricated modules to achieve faster construction times, reduced costs and improved quality; and

- Concurrent engineering – the progressive integration of design, fabrication and construction. BAA believes it is key for all suppliers in the construction process to work together in an integrated team, to ensure that every component fits and is properly engineered for its purpose.

Taken together this approach can be defined as a proactive supply chain approach. It is proactive because BAA is seeking to redefine its existing supply chains in such a way as to discover the ways in which standardisation and modularisation can assist in cost reduction and performance improvement. There are strong similarities with what BAA is attempting, and the McDonald's approach described in the previous chapter, albeit without BAA having the same scope for a one-off, concept and brand-based modularisation. BAA's problem is that it operates in a much greater number of construction supply chains compared with McDonald's, and must manage each one accordingly.

Construction Supply Chains

BAA is currently trying to re-configure its supply chains in order to reduce lead and construction times and to achieve the ambitious '50%' target for cost reduction, set by Sir John Egan.[3] The company perceives the need for drastic improvements in the performance of the construction process, to enable it to afford the investment in facilities that will maintain and improve its competitive advantage in the world airport market. The size and importance of the investment required for 'T5' underlines this point.

BAA has recognised that there can be no single approach to the management of its construction supply chains, as each project will have different business and technical drivers. It is not possible, therefore, to map-out a generic BAA construction supply chain, as each situation is contingent. There are, however, a number of competencies which are common to many projects, but the stage at which each party is brought on-board depends on the specific requirements involved.

BAA believes, however, that internal competencies must always include project management and procurement responsibilities. External competencies will normally include consultants, contractors and, in some cases, 'key suppliers'. The process of appointment for each of these external suppliers has been made more rigorous. The reason for this is because BAA has recognised the need to select and integrate the best external resources to

enable it to achieve continuous improvement. The supplier selection process is covered in more detail in a subsequent chapter.

In general it can be argued that BAA's approach has been to rationalise the number of suppliers and to seek to build closer working relationships with leading firms that have the competence to supply key regular features of BAA's construction spend as efficiently as possible. When companies are in a position to do this BAA is happy to write framework agreements with such suppliers. The thinking here is that open book costing, standardisation and modularisation are not possible for a client or a contractor to achieve unless there is a coincidence of interest between both parties. Clearly, what a supplier wants (as we saw in the Rover and McDonald's cases) is an assurance of regular demand and a high level of spend. In such cases BAA has recognised it is possible to work more closely with a number of key suppliers. In this case study the new vendor qualification system and the framework agreement with AMEC for pavements are described to demonstrate the new approach being developed at BAA.

The Selection of Consultants and Contractors

A wide range of services are supplied by external consultants. These include: architects; structural engineers; building service engineers; civil engineers; construction managers; cost consultants; interior architects; and, retail architects. Historically, selection has been based on reputation and previous experience. Since the introduction of EC legislation covering the procurement of professional services, however, consultants are now selected via BAA 'Vendor Qualification System' (VQS), or through the use of a separate EC Notice for non-framework requirements. Pre-qualification (i.e. short-listing for appointment) also now takes place using project-specific criteria, to ensure that the most suitable firms are employed.

Contractors

Contractors are now introduced at the earliest stage possible, and may now be involved in detailed design work. Historically, selection was usually on the basis of lowest acceptable bid arising

from a select tender competition. Contractors are now being selected and appointed in a similar manner to consultants, i.e. via the VQS system. Thus an approved list is created, following selection based on competitive rates and other project-specific factors.

A 'framework' arrangement is now in place for the design and construction of pavements. AMEC Civil Engineering was selected as the single-source supplier to provide such services for all BAA's airports in south-east England, and has secured the agreement for a maximum of five years (in line with EC regulations). There are three main reasons for BAA employing this strategy:

- to provide a mechanism for on-going cost reduction (through repetition of activities and innovation);
- to remove the need for wasteful tender competitions for each project; and
- quality improvement.

The selection of AMEC was on the basis of bid price for model projects, as well as on their ability to satisfy other objective criteria specific to the agreement. On-going cost management is carried out on an 'open book' basis, with benchmarking of international costs for comparative purposes. Further 'preferred supplier' frameworks are also being established for building contractors.

The Selection of Key Sub-Contract and Component Suppliers

Component and sub-contract suppliers to construction projects are normally the last in line for selection, and usually only after the main contractor has been chosen and the detailed design is complete. Historically at BAA all main sub-contract suppliers were selected on a competitive tendering basis from short-lists of reputable firms. There are many arguments that can be made for the inclusion of suppliers at an earlier stage, due to the potential impact of key components on the design, buildability and life-cycle costs of

a project. BAA is now developing a system of preferred supplier framework agreements, for the procurement of key components. These include commodities such as: steelwork; concrete; cladding; roofing; ductwork; air handling units; chillers; partitions; ceilings; and seating. This approach ensures much earlier involvement of key component and sub-contract suppliers at the formative stages of project development. Main contractors are, however, still responsible for the selection of non-critical sub-contact and component suppliers, under the standard forms of construction contract.

Case Study: The Pavement Framework

BAA is clearly taking a proactive approach in supplier selection and in managing its various construction supply chains. This is evident in the introduction of major initiatives such as the 'Pavement Team', 'Project Genesis' and strategic supply 'frameworks' for key commodities. These strategies are still in their infancy and, in some cases, it is still too early to measure the benefits associated with these new approaches. It is now understood, however, that significant gains have been made on the construction of pavements, and that many techniques and lessons have been learned on 'Project Genesis', regarding standardisation and supply chain integration.

The constraints within this book, unfortunately, prevent a detailed analysis of all of the strategies in each of these areas. BAA's new approach to the management of one of its more critical and regular areas of spend is described below. By understanding what BAA is trying to achieve through its 'Pavement Framework' with AMEC, it is possible to draw some general conclusions about the proactive supply chain specific re-engineering approach being developed in the company.

Background

Historically, BAA had experienced a number of problems with the construction and maintenance of its runway pavements. High costs were often the result of a generally adversarial and fragmented procurement approach adopted by the airport operator and its

contractors. This situation was particularly evident at Gatwick. Although this site had a reputation for high quality work, the *modus operandi* was characterised by confrontation, inefficiency and waste. Contractual claims were often high, based around the restricted way of working and wasted materials. This situation eventually led to contractors submitting higher tender prices, to compensate for the level of hassle experienced on pavement projects. The background of rising costs and claims meant that BAA had to totally re-appraise its approach to procuring pavements, if it was to afford the level of investment required for the future expansion of its facilities.

Procurement Strategy

To counter the problems identified, BAA realised that a more proactive approach was required to managing its pavement supply chains. If it wanted to reduce cost and bring about continuous improvement, then it would have to totally re-engineer its procurement strategy. This could only be achieved through a more integrated approach, in which all participants could innovate and streamline the process. This meant that BAA would have to work more closely with the 'best' contractors and suppliers and take a proactive position in the management of the whole supply chain, rather than just the main contractor interface, in order to help deliver these improvements.

Traditional Approach

The traditional approach to the management of pavement projects may be described as fragmented and reactive. The programme of work was carried out on a piecemeal basis, with individual project managers responsible for producing drawings, specifications, and invitations to tender. They were also required to manage the interface with the various airport operators. In reality, this meant that there were many different systems and approaches being used without any real consistency of outcome for end-users.

Contractors were selected using the traditional tendering approach, which meant that a different contractor would often be selected for each new project, without any input into the design

solution. Although there were some successful projects, this 'one-off' approach to programme management generally resulted in an inefficient way of working:

- high costs were experienced, associated with setting up the site and batching plant on each occasion; and
- contractors had to effectively start near the bottom of the 'learning curve' on each new project.

New Approach

It was decided, as a result of these inefficiencies, that the most appropriate way forward would be to develop a strategic framework, with a single-source supplier, to construct, improve and maintain all pavements at BAA airports in the south and east of England (i.e. Gatwick, Heathrow, Stanstead and Southampton). The estimated value of the contract was approximately £150 million over a period of five years. The selection process, incorporating all requirements of EC procurement legislation, led to the appointment of AMEC Civil Engineering in November 1995. The relationship took on a separate identity to either BAA or AMEC, becoming known as the *'Pavement Team'*. Initial projects were located at Gatwick, where the 'Team' was thrown in at the deep end, working on a number of schemes stored up in anticipation of implementation of the new framework. Following some initial success, Scottish Airports has expressed an interest in the team's approach.

Strategic Drivers

It is clear that there were a number of reasons for developing this new approach. The strategic drivers influencing change in the procurement of pavement works were essentially in line with the basic principles underpinning BAA's approach to managing its construction programme, described earlier in this chapter, namely:

- standardised process;
- improve productivity/reduce costs for Terminal 5;
- more project-focused and integrated strategy.

Since the introduction of the 'Continuing Improvement in the Project Process' initiative (CIPP), BAA has moved towards a more transparent and standardised process for managing its projects. Consequently, power has moved away from project managers and more towards the customers – the individual airports. The introduction of the framework for pavements is part of BAA's move towards standardisation and continuous improvement.

As already mentioned, one of the primary drivers for improvement is the need to improve the business case for the development of Terminal 5. Without the necessary improvements in productivity and cost, BAA would not be able to afford the massive investment required for this important project. Improved performance was not an option, it was absolutely imperative.

BAA has also recognised that many of the barriers in the traditional construction process need to be removed, in order to eliminate unnecessary waste, duplication of effort, and improve the buildability of projects. This means a more project-focused and integrated approach is required, involving the key players in the process at the earliest stage possible. The pavement team provides a totally integrated service, and includes the activities of: design; estimating; planning; construction; and maintenance. The emphasis is on the 'whole life-cycle cost' of assets, rather than short-term cost. The perceived benefits of a more integrated approach include:

- the contractor more closely understands BAA's requirements;
- continuous improvement in performance can be managed; and
- the ability to draw on supplier flexibility and innovative working practices within the constraints of a 'live' airport environment.

The last point is particularly appropriate. Often, construction in an airport environment is very expensive, due to the obvious operating constraints imposed by aircraft and passenger movements. This regularly means that certain activities can only take place at night, which naturally attract higher wage rates. It is clearly in BAA's interests to achieve better methods of design and construction, in order to maximise the utility of contractor resources and, therefore, keep costs down. It would not be possible

to draw on contractor innovation and flexibility in this way using more traditional, one-off, arms-length contracting approaches. Clearly there is scope for AMEC to influence the design activity in this arrangement, which should also ultimately improve buildability.

Fit-for-Purpose Relationships

A number of factors appear to have informed the development of the new procurement strategy, including: product characteristics; supply market difficulties; and spend characteristics.

- **Product difficulties:** although the construction of runway pavements may appear to be a relatively simple operation to many people, there are some 'product' characteristics which make it important to work with firms of a high level of expertise and experience. Key requirements for the finished surface include: high quality materials; very hard-wearing; laid to fine tolerances; good drainage properties; and be free from debris, which could otherwise cause grit damage to aircraft engines. The required quality of surface is achieved through the use of appropriate materials, mix and method of laying. This type of work is much more specialist than road paving. It is, therefore, imperative to work with the right type of supplier(s)

- **Market difficulties:** the choice amongst suitable contractors is effectively restricted, depending on the size of the specific pavement project. For large areas (over 50,000 m^2) BAA believes that there are probably only between four and six contractors with the necessary capacity and capabilities to undertake such a project. For smaller jobs (say for the construction of 50 m length of taxiway), there could be another dozen smaller firms which would be considered. All of these contractors are UK based. There are potentially another 16 suitable firms in Europe. The choice in the market is therefore fairly restricted, although not overly so.

- **Spend characteristics:** BAA clearly has a regular, process spend for this area of work, and wishes to take advantage of the

potential economies of scale available through leveraging the supply base and aiming for continuous improvement. In managing its demand more effectively, the airport operator is able to work with the supply base to produce a more product focused and efficient process.

Considering the above criteria, it became clear that BAA should work with a smaller number of highly competent and innovative contractors, in order to produce the desired improvement in performance. The question was, how many suppliers? It appears that this issue was the cause of some debate, which resulted in the company eventually selecting a strategy to work with a single-source supplier. The reasoning behind this is explained by one of the critical factors which supports the successful use of long-term collaborative relationships – *the incentive to the contractor.* BAA recognised that unless it could offer a suitable level of work, size and regularity of spend, then there would be little motivation for any firm(s) to tie themselves into such a disciplined arrangement.

At one stage, an option was put forward that would involve one contractor based at Gatwick, and another based at Heathrow. It was decided that if work dried up at one location, which would most likely be Gatwick, then that contractor would face a loss of work and the partnership could conceivably break-down. It was also felt that more worthwhile savings could be delivered by concentrating on a single contractor managed in a performance-measured relationship. The relative utility of this approach is discussed more fully in the final chapter.

BAA then had to develop an appropriate model for contractor selection, that would not only deliver the right result, but also satisfy EC procurement rules. The process of selection is described in more detail in Chapter 12, *Supplier Appraisal and Development.*

Following the rigorous process of selection, BAA appointed AMEC Civil Engineering as its single-source supplier for pavements in the south-east. This firm is a traditional civil engineering contractor with a turnover of approximately £300-350 million. Historically, about two-thirds of the contractor's work was attributed to public highways projects, but this now accounts for only one-third of the current workload. Current business strategies

incorporate the desire to move towards more 'supply frameworks' and DBFO schemes. The firm is also involved in some project-specific partnering.

As we have stated in earlier chapters, the nature of client procurement behaviour will inevitably impact on the approaches adopted by the main contractor. This interesting point becomes clear when AMEC's selection process for sub-contractors is considered. When BAA *buys* AMEC, it actually *pays* for the whole supply chain. It is logical, therefore, that once in a performance relationship of this type, the main contractor will cascade the client's requirements down to all of its own suppliers. This, of course, should be done in a holistic way, and not become an excuse for passing responsibility and risk. In a long-term supply chain, such a negative approach would simply backfire; if there are any weak-links it will reflect on all participants.

AMEC has naturally been careful in the initial selection of its sub-contractors, due to strict performance criteria included in the long-term agreement with BAA. The contractor had experienced good working relationships with a number of sub-contractors for a period of time. These firms were also not necessarily selected on the basis of lowest bid price, but other important criteria were considered, including their previous track-record, etc.

The whole Pavement Team is now involved in appraisal and selection of contractors/suppliers, taking a collective responsibility.

Relationship Management

The form of contract governing the relationship between client and contractor on projects within the Pavement Framework is the New Engineering Contract (Option C, Target Contract with Activity Schedule). This approach allows for target costs to be established, and variations to be dealt with as 'compensation events' using open-book evaluation. It is interesting to note that other management techniques have been introduced to help deliver the required benefits.

In pursuing its aim for greater levels of integration between client and contractor, BAA has established combined offices for the Pavement Team. To remove the potential for a 'them and us'

situation, it was decided that all parties involved with the process, regardless of who their employer is, should work together in the same space.

Another important aspect concerning the management of the supply relationship is the need to reduce any duplicated or other unnecessary administration. This problem can often occur on construction projects, in the form of debates over risks and responsibilities, interpreting the contract to suit one's position, and any resulting correspondence produced to justify decisions and actions made. Members of the Pavement Team suggest that the conditions of contract are almost never referred to, and only used as a fall-back if something goes wrong. Furthermore, clauses are not cross-referenced in any correspondence.

Traditionally, site staff on both sides of the supply relationship are used to keeping comprehensive records to cover all eventualities. The problem is that this means duplicated information, which must be cross-checked and any differences reconciled. The Pavement Team is attempting to reduce the need for this practice over time, moving towards keeping one set of integrated records. If trust exists, then the records from both sides should effectively register exactly the same details. The Team believes that this approach will work through demonstration; confidence will be built when the records provide consistent information, and site staff will see that there is no need to duplicate effort. The Team is also developing a system of joint quality control, to further the aim of reducing duplication of effort. The fully auditable process puts the responsibility for quality where it is best managed.

BAA is attempting to engineer the culture away from the adversarial and claims-conscious approach of the past, to a more collaborative and flexible working relationship. This means working together to plan-out any unnecessary changes, and turning a 'blind eye' to minor ones. Two major attributes of a successful working relationship are described as 'openness' and 'good communication'. The Team recognises that conflict may still occur within the team, and may actually be necessary to resolve some issues. An agreed procedure has been put in place: if there is a dispute, the first port of call is to take the problem to the next person up the

organisational ladder for assistance. Conflict resolution is initially carried out in a workshop environment.

Initial partnering workshops were held in order to engender the required spirit of team-working and deliver the message about what BAA intends the framework to achieve. Team members believed this has worked well, providing a clear foundation for the framework.

A problem that can occur on any long-term project is one of staff continuity. It is extremely unlikely that the original dedicated AMEC staff will work on the framework for its entire duration of five years. As long as the process of continuity is managed carefully, the rotation of personnel should not cause too much disruption; the success of the Team depends on the right blend of skills, competencies and attitudes, rather than specific personalities. BAA and the Pavement Team have recognised this point, retaining the right of veto to remove any 'misfits' from the team, if required.

Another important aspect of relationship management is the activity of performance measurement; what does not get measured does not get done. The theory behind this point, as well as case study information from BAA and the Pavement Team is covered in Chapter 15. Similar measures and controls are applied to sub-contractors in the pavement supply chain as are applied to AMEC, including open-book costing, etc.

Benefits and Problems

There are a number of benefits for both client and contractor, which should come to fruition during the term of the five year framework. The theoretical benefits which should ultimately flow are discussed first. The nature of the specific problems experienced and then the benefits which have actually been realised eighteen months into the operation of the contract are also analysed.

Theoretical Benefits to BAA

- A more holistic approach to scheme prioritisation and resource planning. Previously the pavement programme was sporadic and lacked co-ordination. BAA states that there were occasions when three different runway schemes were being constructed

quite independently of one another, at the same airport, at the same time, and each with a different contractor. By providing a focal point for pavements, BAA should be able to benefit from a more optimal approach to demand management.

- Closer alignment with end-user requirements, providing better satisfaction: higher quality and less costly product.

- More efficient solutions on site: closer alignment between pavement team and airport operations should lead to a more optimal method for construction, working within the operational restrictions of a live airport environment. Risks should be clearly identified early on and managed effectively.

- Flexibility in planning: the contractor is always available, and should be fairly responsive to client needs. This should effectively provide the benefits of vertical integration without the costs of ownership.

- Shorter lead times: an earlier start on site for construction than using traditional procurement methods should be possible.

- Streamlined administration of projects.

Theoretical Benefits to AMEC

- Regular turnover and profit.

- Reduced overheads: savings made through not having to put together tender bids on a continual basis for pavement projects.

- More efficient use of contractor's resources: through earlier and better planning of demand, the contractor is able to more efficiently manage supply. This should have a positive impact on AMEC's sourcing strategy; the contractor is more likely to obtain a settled pool of directly controlled labour, which should be more cost-effective, given continuity of work and appropriate incentives for performance.

- Better training and conditions for the workforce: through being able to plan resources and take a longer-term view, the contractor is better placed to fulfil its capability and competence needs. Site workers could be offered longer-term contracts with more favourable terms and conditions. The greater level of security, allied with performance-based incentives and greater autonomy, should lead to improvements in performance.

- Less resources tied up post-project completion: all aspects/costs of a specific project should be completed within a month or two of finishing. Traditionally, this process could drag on for up to two years. This means less staff are diverted and distracted by wasteful activities.

- Less correspondence and confrontation: the contractor should be able to concentrate on doing what it does best – 'getting on with job'.

Problems Experienced

As would be expected with a bold experiment such as this, a number of 'teething' problems have been experienced. Many of these appear to relate to minor matters, such as establishing common approaches to information collection and communication, issues which both sides have to tackle. There are, however, some more fundamental problems to be addressed, such as alignment of the different organisational cultures and ways of doing things. The main problems are summarised below:

- **Expectations:** The Team felt that unrealistic expectations were initially raised for the first jobs at Gatwick, with instant benefits anticipated by a number of client representatives. Benefits do not naturally flow simply because a framework is in place, they take time to come through. Although the Team was under early pressure to perform, after much hard work, benefits are now starting to be delivered.

- **Management Input:** Perhaps both sides of the relationship initially under-estimated the amount of work required to set the new framework in motion. AMEC was largely left to itself at the start of the contract, but soon realised that a more pro-active client involvement would be required if the arrangement was going to succeed. BAA's experience of frameworks up to this time was essentially with commodity supplies, items which generally do not require the same level of management involvement at the commencement stage. BAA, took this point on-board, realising that it should have established a management team, including members from both organisations, on day one.

- **Internal Perceptions:** In changing its approach BAA had to manage the perceptions of its internal staff, including project managers and airport representatives, as well as its all important external customers. The more optimal approach to demand management would inevitably reduce the influence of individual project managers in prioritising schemes. There was always a certain degree of competition between project managers, but the new arrangements meant that some may see other schemes progressing at the expense of their own. Furthermore, airport engineers felt that they were excluded from the process and naturally felt less inclined to work positively with the new approach. BAA had to put across the message that this was not personal, but in the interest of best utilisation of resources, and that all should still play their part. Poor perceptions were overcome through weekly planning meetings to inform all parties of programming decisions and the reasoning behind the approaches taken.

- **External Perceptions:** BAA was clearly looking to take the longer-term view, in order to improve the efficiency of its process. The main problem here was that the airlines had much shorter horizons; they were more concerned with profit levels tomorrow, and less with the facilities BAA was trying to develop for five years time. In their extremely competitive environment, they naturally wanted minimum disruption to their

businesses, which may not be in existence in the long-term. Yes, they wanted improved facilities, but they did not relish the short-term pain that may be suffered in making the necessary improvements. This divergence of strategy required careful relationship management.

Benefits Realised

The Pavement Framework is now approaching two years old. The key questions to all concerned are:

- how is it performing? and;
- is it delivering?

Recent developments indicate that the benefits predicted at the outset are starting to come through. For instance cost savings are reported to be as high as 15%, due to a combination of design development, improvements in specification, site productivity and operational impact.[4]

Conclusions

BAA has understood the need for introducing greater levels of integration into the construction process, as well as economies of scale and scope for continuous improvement. With the introduction of the pavement framework, the airport operator has set out its strategic objectives and selected a single-source contractor to work with in the achievement of necessary performance improvements.

Some of the predicted benefits are now starting to come through, including significant levels of cost reduction. Only one major concern exists, and this relates to the long-term achievement of value for money with the single-sourcing approach adopted. It is clear that there are sound logistical reasons for the development of this strategy, although the danger associated with single-sourcing appears to have been given little weighting. It is entirely possible that BAA will build a long-term dependency on AMEC for the production of pavements. The Pavement Team is currently working well and innovating more effective and efficient ways of working. The danger is, that while year-on-year improvements in performance may be measured during the current framework, there

are a number of fundamental problems that could arise in the future:

- what will the effect of this strategy be on the supply market?
- who will be able to compete with AMEC's pavement expertise when the framework comes up for renewal?
- what impact will this have on market prices?

The single-source approach effectively starves the rest of the market of a great deal of this type of specialist work for the duration of the framework. This could have three possible effects: firstly, other suppliers could become more efficient with other clients during this period; secondly, they could become less efficient than AMEC, due to a lack of work and incentive to innovate; or thirdly, they may withdraw entirely from this sector of activity, due to the lack of available profit motive. The worst case scenario is that suppliers may be put out of business altogether if the BAA pipeline of work dries up. The most likely outcome, however, is that AMEC improves the process to such an extent that no other contractor could realistically compete in the next round of bidding. BAA would then be in a position of power dependency with its supplier, and would have to be very careful in the management of the relationship to ensure that negotiated costs do not gradually increase, and erode the value for money that is currently being achieved.

The question is, could BAA have developed a strategy of dual-sourcing to counter the risk we have described? Would half the current level of work still have been attractive to AMEC, or another supplier, if BAA had dual-sourced? Although one supply relationship means that it is easier for BAA to administer the framework, does the concentration of work with AMEC result in any more significant increases in economies of scale beyond a dual-sourcing arrangement?

The problems that have been highlighted may well not come to light until AMEC wins the next framework in the year 2000. BAA may well need to think through these issues in preparation for that time.

Notes

[1] BAA (1995) 'Taking Off for the 21st Century', *Annual Report and Accounts.*
[2] BAA (1994) 'World Class Airports', *Report and Accounts.*
[3] NCE/NB (1995) 'BAA: 21st Century Airports', *New Civil Engineer/New Builder BAA Supplement*, May.
[4] Leitch, J. (1997) '15 Per-Cent Savings Come From Airport JV', *Contract Journal*, 6 August.

Chapter 7: Gazeley Properties: The Impresario of Construction Supply Chain Management

This case illustrates how a company can be highly successful by acting as an 'impresario' in a particular type of construction supply chain. The company has a methodology that is project-specific, but utilises all of the relational and contracting options available to it on a 'fit-for-purpose' basis.

The Company and its Value Chain

Gazeley Properties is a wholly-owned subsidiary of Asda plc, set up as a stand-alone property developer in 1987. The company's original aim was to generate additional development opportunities arising from the Group's new stores expansion programme. This resulted in the delivery of approximately 50 food stores and 200 non-food retail outlets during a period of about five years.

Although primarily a developer, with its operations in the construction and development supply chain, Gazeley considers itself to be a professional management company. Gazeley has a strong customer focus, and believes in providing a 'total service' for its clients, isolating the end-user from the rigours of the development process. In providing this service, the developer is attempting to create a culture which combines attributes from the retail sector with a manufacturing ethos. One of its key

differentiating factors is considered to be the ability to assemble and deliver fairly complex projects more quickly than its competitors.

Gazeley is targeted to deliver a return on investment of 15% or more, and presently generates annual operating profits in the region of £7 million. The company currently has between £30 and £50 million of work in progress.

> **Mission Statement:** *To grow the value of Gazeley by capitalising upon its position of market leader in the development of quality distribution space and its skills as a retail warehouse developer.*
>
> (Gazeley Properties Business Plan, 1996/97)

This is the first case discussed in which an organisation's primary supply chain directly involves construction; in all of the other cases construction has been a complementary rather than critical competence, supporting the main business activity. Gazeley has effectively positioned itself in the role of the integrator, or the regular interface with, the supply market on behalf of clients with a fluctuating or 'one-off' demand for construction. It has developed an expertise in procuring certain forms of construction, that such clients would have neither the desire nor the ability to match on their own. This is because for the clients, on whose behalf Gazeley acts as an impresario, their primary, supply chains are focused on other industrial sectors, where construction is a residual or, at best, a complementary competence. In this respect Gazeley fulfils a real need for construction clients, providing the countervailing power and leverage against the potential advantages held by the construction supply market.

Approximately half of Gazeley's business is in the development of distribution centres, while the remaining 50% is in non-food retail facilities. Both markets are very much demand-led; end-users and other third parties approach the developer when they require space, although Gazeley is proactive in marketing development opportunities. A high profile and sound reputation are, therefore, essential in gaining future work. Gazeley will assemble a package

for the client (end-user) and provide the essential link with a suitable investment fund-holder.

Gazeley attempts to manage the development supply chain in such a way as to maximise its margin while satisfying its clients' aspirations in terms of utility and cost. The size of its margin is proportional to the amount of value-added during the development process, and is derived from the arithmetic difference between the value of a site prior to development and the final price to the end-user/investment fund, less all development costs. The development process involves a multiplicity of interfaces, providing the potential for risks and additional costs. Transaction cost skills are, therefore, essential in minimising the amount of non-value added costs through the supply chain, which could potentially erode the development margin.

Clearly, the construction process is integral with the development supply chain. Performance, in terms of management of the construction supply chain, is therefore critical to the overall success of the business. The total value of Gazeley's construction programme will vary from year to year, depending on the conditions in its market. Its turnover in 1995 was £45 million, which generated a profit of £7 million.

Procurement Strategy

Gazeley's procurement strategy is widely publicised as a good example of 'partnering',[1] although the company prefers the more specific definition of 'a sustainable approach to optimising the supply chain'.[2] The developer is not in the business of establishing close supply relationships for the sake of it, or following the latest fad in the hope that benefits may result. Gazeley is quite clear that it wishes to maximise its position on the supply chain, and to achieve this end it needs to manage a portfolio of the most appropriate relational forms; some close/collaborative and some more arms-length. Each project requires specific competencies and particular levels of integration between these, depending on the business imperatives concerned. Gazeley follows four basic steps in arriving at its 'fit-for-purpose' procurement strategies:

- Initially a risk analysis is undertaken, to identify the potential impact of all possible risks, and when and how to most effectively manage them.

- The scheme requirements are then outlined to the project team.

- An overview of procurement options is discussed, emphasising the specific business imperatives and risks.

- A decision is reached on the optimum arrangements for the supply chain concerned.

Traditional Approach

In the past, Gazeley usually elected to follow the conventional procurement routes of 'design-build' or 'management contracting'. Construction management (CM) was not usually favoured, for two main reasons. Firstly, many CM firms did not carry sufficient indemnity insurance for this type of work; most fund-holders insisted on a minimum cover of £7.5 million for each claim, and an average public liability insurance of £20 million. This limitation effectively restricted the supply market from which to select suitable CM firms. Construction management also requires a great deal of proactive involvement by the client to ensure successful performance. Gazeley's view is that this approach is far too resource-intensive for the type of projects in which it is involved.

A New Approach

Gazeley's procurement strategies are now devised on a 'fit-for-purpose' basis, balancing the needs of the end-user, the investment fund and the contractor with its own requirements. Each project has specific needs and priorities and, therefore, requires different competencies and levels of integration between these. The company is, therefore, aiming towards a supply chain management approach to procurement, in order to reduce development time and costs. In essence, this is being achieved through earlier involvement and a greater degree of integration between key suppliers, contractors and designers. The main drivers behind the new approach are the

need to increase the 'value-added' in an increasingly competitive market, to improve customer satisfaction and return on investment.

Gazeley is determined that the drive for improvement should be continuous, and while it is developing the efficiency of its supply chains, the company is also considering other innovations, including the standardisation of components and prefabrication. For instance, it is investigating the possibility of introducing modular office units into the construction of warehouses. If successful, this approach would ultimately render the construction process quicker and cheaper, and Gazeley more competitive in the service provided to its customers.

To develop these innovations, however, Gazeley recognises the need to collaborate with suitable firms with the required competencies and capabilities. This will have a further impact on the company's supply chain and its sourcing strategies, although these innovations are still in the embryonic stage. Many barriers still need to be overcome, not the least of which is the inherent conservatism of property investors. While they clearly need to protect their investment, and reduce the level of risk as far as possible, this desire often tends to reduce the potential for innovation in the construction methods and materials used. For most traditional property investors steel cladding, brick facing and an inner skin of block work are the accepted standards.

The Supply Chain Management Approach

Gazeley's goal is a more integrated approach to the management of its construction supply chains. This will involve identifying the key suppliers of goods and services, who will be involved at the appropriate stages of any project. The company has a standard approach which on first appearance, may give the impression that each project is approached as a 'one-off'. In reality, however, although each development project is unique, Gazeley is working towards a system in which each of the players in the process will normally be the same for the key competencies required. Gazeley has a pool of regular suppliers for those important areas of activity in which it has a frequent external resource requirement. Figure 7.1 conceptualises Gazeley's approach to supply chain management.

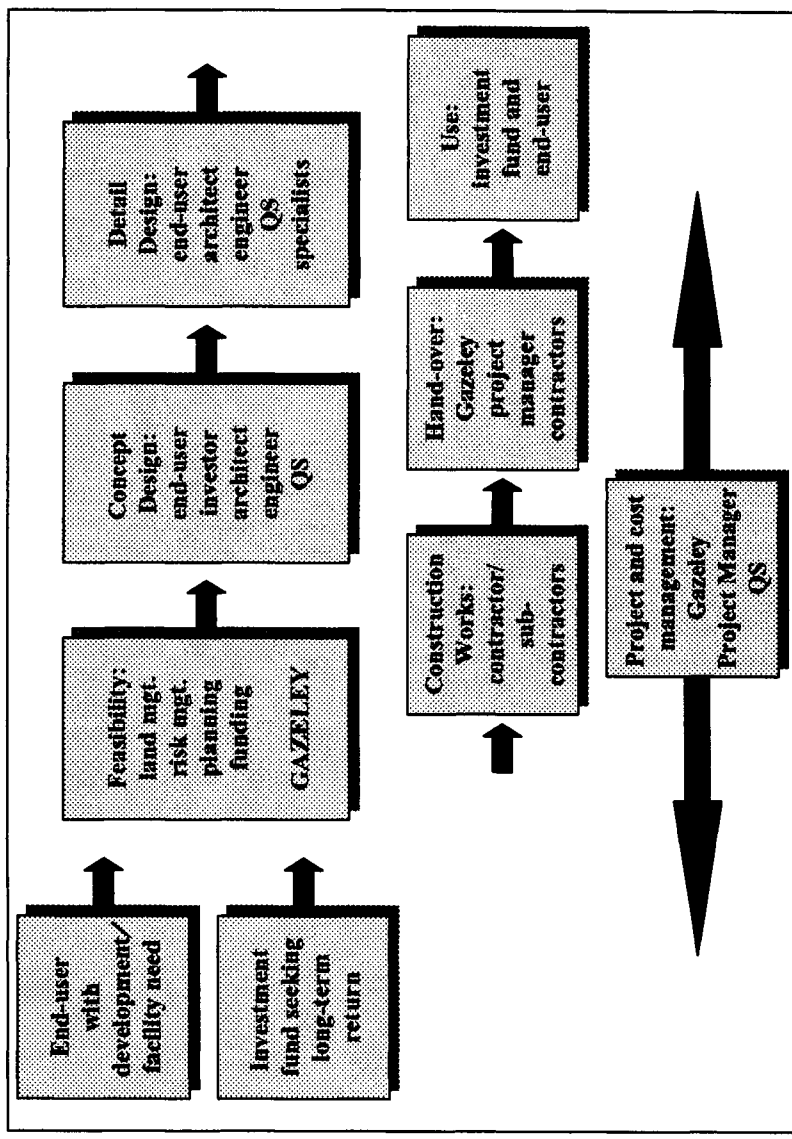


Figure 7.1: Gazeley Properties' Development Supply Chain

The front-end of the development supply chain is slightly different to many construction supply chains, in so far as there is a separation of roles between the end-user and the fund provider. The developer is effectively positioned between these two players and the construction supply market. It is more often the case that clients will provide their own finance for a construction scheme, although the PFI initiative is starting to change this maxim in the public sector.

Gazeley's role is critical in the development process; it has to match and balance the needs of the end-user with those of a suitable investment fund-holder, providing a suitable land/ development package which generates an acceptable return. This requires the developer to carry out a robust feasibility exercise to ensure that all risks are costed and effectively managed, and that the project is viable.

Project managers (PM) provide the interface between the client (Gazeley) and the construction team of consultants and main contractor. The PM may be an in-house employee, or appointed from an external pool of regularly used consultants. The main reason for this approach is that Gazeley needs to retain a core capability in this activity, but also be flexible enough to manage the fluctuations in demand for its services. The internal customer is the development surveyor, who is ultimately responsible for delivering the investment within the agreed performance parameters.

Concept design is carried out in close consultation with the end-user and the investment fund in order to resolve any conflicts in their respective requirements and specifications. A 'base' specification is provided for the fund-holder, while any tenant enhancements are incorporated into an additional specification.

Detail design may involve an input from key suppliers for wall cladding (Hunter Douglas), roofing (Kingspan) and heating systems (Carrier). Traditionally main contractors have not had a great deal of involvement during the design stage; the process is now evolving in such a way as to allow earlier participation.

Strategic Drivers

In providing its service, Gazeley must satisfy a number of stakeholders, including: the investment fund, the end-user, as well as its internal stakeholder, the board. A number of competing drivers, therefore, act on Gazeley in its supply chain.

There is a need for quick project delivery to enable the developer to satisfy the end-user's business case requirements and remain competitive. The competencies which satisfy this driver, or those which can improve the speed of delivery, will be critical.

Clearly, Gazeley must be able to deliver the best specification for a given price, and all customers must be delighted. The long-term interests of the investment fund, and the utility requirements of end-user must be satisfied.

All parties must also be satisfied in terms of cost. The fund-holder needs to be confident that his long-term investment aspirations will be achieved. The end-user requires reasonable leasing/running costs, which are compatible with its own business case. Gazeley has to match these requirements and secure an adequate return for its own investment and risk. All these factors point towards the need for careful cost management and reduction of any non value-added costs.

Fit-for-Purpose Relationships

Gazeley has elected to retain in-house those competencies which it deems are critical to the successful management of development projects in terms of programme, cost and quality objectives. The four core competencies which are controlled in-house are:

- **Land management:** involving site search, acquisition and planning requirements.

- **Risk management:** appraisal of development viability, and assessment/management of associated commercial risks. This process requires the allocation of risk to where it is best managed. For example, Gazeley considers that the client should usually take control of ground risks. Risks may also arise in terms of quality (investment fund and end-user specifications),

time (usually a very pressing requirement), and client changes (there is rarely a fixed brief, as flexibility is usually required in certain parts of the project - the developer has to identify what is fixed, what needs to be fixed, and what is variable and how these factors integrate within the rest of the development.)

- **Planning:** expertise in town and country planning is critical to Gazeley's long-term business strategies, whether embracing project specific issues or involvement in local structure development plans.

- **Development management:** assembling and co-ordinating the various competencies required throughout the process.

Close external supply relationships have been established for the following competencies:

- **Project Management:** Very close relationships are evident with external project managers, including Key Project Services, especially on complex projects. Gazeley considers that there is essentially a good market for this type of service, with many suitable PM's available.

- **Construction:** preferred suppliers now include: Simons, Wates and Birse.

- **Architect:** Chetwood Associates.

- **Structural Engineer:** Edward Roscoe Associates.

- **M&E Engineer:** Kelly Taylor Associates.

- **Quantity Surveyor:** WH Stephens.

- **Environmental Consultants:** Delta Simms.

Gazeley also employs transparent costing throughout the supply chain. Gazeley's view is that open-book costing normally means there is no hiding place for the inefficient and that the approach helps to provide understanding, trust and open behaviour.

Benefits and Problems

Gazeley believes that it has been able to achieve substantial benefits through closer working relationships and the management of a more robust supply chain. These include:

- An incremental improvement in quality means less defects.
- Reductions in cost: historical cost database indicates that the cost of distribution warehouses has fallen by approximately 10% in real terms.
- An incremental improvement in cost certainty through greater predictability means less risk in terms of development 'yield' calculation.
- Increased certainty of completion time.
- A better understanding of risks: leads to more effective management.
- Resistance by some personalities (internal and external) is removed from the development process, e.g. obstructive / adversarial project manager.
- Occasional complacency is managed by removing firms from the supply chain for a while, until there are sufficiently motivated to return. This is referred to at Gazeley as putting them in the 'sin bin'.

It is clear that Gazeley has developed the role of an intelligent construction client, even though it is not the funding party or the end-user. Effectively it acts as a 'regular' client on behalf of other

clients with a variable, or 'one-off' demand for construction. Gazeley is, therefore, able to gain valuable expertise in the management of construction and create longer-term supply chains to deliver continuous improvement for its customers and its own benefit. This impresario role in construction can only be achieved and sustained however if the intelligent client role is understood and acted upon.

Gazeley demonstrates, with its recognition of the need to develop the appropriate relationships for specific project requirements, that it has the internal competence and common-sense approach that is necessary to sustain its chosen role. Interestingly enough, Gazeley Properties appears to use all of the universe of relationship and contracting tools and techniques that are available to the developer. The company, quite correctly has eschewed fads like 'partnership' in favour of single source, preferred supply and multiple sourcing whenever it seems that this is the most appropriate thing to do given the specific circumstances that face it. This is testament to a well-run company that, at the time of writing, appears to be both strategically and operationally aligned.

Notes

[1] The technical press have reported on Gazeley's approach on several occasions, including: Ridout, G. (1995) 'Talking Sheds' *Building*, 11 August; and Smit, J. (1995) 'Team Players', *New Civil Engineer*, 28 September.

[2] Pat McGillycuddy, Construction Director, Gazeley Properties.

Chapter 8: Company X: Breaking Supplier Dependency

This is a case of a client breaking its dependency on particular suppliers through the use of preferred supplier contract management. Company X moved away from a strategy of single-source (partnering), which seemed to lack the impetus instilled by competition, to an approach incorporating a more appropriate range of sourcing strategies. This highlights how an organisation can shift the balance from potential to actual power in its supply relationships.

Introduction

The company analysed in this case study wishes to remain anonymous, in order to preserve its competitive advantage. The authors fully understand this position, and are grateful for the company's authority to publish this chapter in an edited format. The omission of specific details of the company and its procurement strategy does not detract from the central message of this case. It is not important who the company is, or the names of its suppliers; the important lessons are provided by the

circumstances impacting on the company and its resultant decisions.

Many regular clients for construction are starting to develop strategies incorporating more long-term and collaborative relationships with their suppliers. Others have been experimenting with such approaches for a number of years. Perhaps the most famous of these is the relationship between Marks and Spencer and Bovis. There are some clients, however, who have tried 'partnering' approaches and experienced problems. Company X is an example of a client which developed strategic single-sourcing and, on realising that this was not the most effective way for it to do business, changed its approach to incorporate preferred supplier relationships. The main drivers for this change were the need for improved performance and innovation.

In this chapter we will explore how Company X has evolved its approach to construction procurement, and highlight why and how it reduced its position of dependency to deliver improved performance. We explore the company, its value chain, procurement strategies and how it reduced its dependency in critical areas of the construction supply chain.

The Company

Company X is a major player in a research-based, global market. It's core business is involved in the development of innovative, value-added products. With an annual revenue in the order of $10 billion, the company has three main areas of business, focused on specific product segments within its market.

Company X operates on an international level, with over forty thousand employees world-wide, and its products are available in more than 150 countries. The company's largest market is located in the United States, followed by Europe, Asia, Canada/Latin America and Africa/Middle East. Company X's current strategies are aimed at maintaining and growing a pipeline of products through innovation. This naturally requires a heavy investment in R&D.

Value Chain Positioning

Although Company X operates within a single industry, the industry is by no means monolithic. There are two distinct sectors of activity:

- one is focused on commodity products; and
- the other has an emphasis on research based activities.

Company X is a major player in the latter segment. Each has quite different dynamic forces and drivers acting on the value chains concerned. The commodity-based market is very competitive, generally on the basis of low-margin/high turnover products. This results in a cost-focused value chain. The research based sector, however, is concerned with the development of new products, where speed to market is the primary driver. The companies aiming to sustain their competitive positions in this value chain, do so by attempting to monopolise a new product and hopefully command high margins. This tends to result in a value chain which is less cost-focused, but where time is a primary driver.

Construction and Business Needs

To facilitate the group's strategy of growth, Company X is looking to significantly increase the size of its research facilities over the next five years. This requires a considerable construction programme involving new-build projects and a major number of refurbishments. The company commissions a steady stream of small to medium sized construction projects, with a major new structure, in the $50–100 million range, on average once every two years.

Construction Supply Chain

The drivers in the primary supply chain inevitably influence those in the secondary supply chains, such as construction. With speed to market being a chief criterion, closely followed by the need for high quality facilities, Company X's construction supply chain and procurement strategies are necessarily configured to satisfy these drivers. It's construction supply chains are arranged to maximise

the integration between designers, constructors, and project managers with the client, to reduce lead times.

To achieve continuous improvement, Company X understands the need to innovate and improve the performance of its construction programme, through the use of new technologies, processes and materials. A key success factor which underpins such innovation is the early involvement of the architect and construction management organisation. This allows the design to be developed on an iterative basis, incorporating the necessary client changes. The nature of the business means that Company X needs the flexibility to finalise the design at the latest possible stage; developments in the business environment and its primary value chains necessitate this.

Procurement Strategy

Company X clearly has an on-going construction programme involving new-build projects as well as a significant number of refurbishments of existing facilities. Construction Management (American style) is the preferred route for most projects. There are three main reasons for the popularity of this organisational method on Company X projects:

- CM allows the client to have a single point of contact with the supply base;
- it provides the necessary flexibility for changes relating to business needs; and most importantly
- a fast-track programme is possible.

Contractors are sometimes procured on a Guaranteed Maximum Price basis, as price certainty is a major business requirement for Company X. Value engineering techniques may, therefore, be employed to ensure that cost targets are achieved. The focus here is on 'value-added' when managing construction activities to support the relatively high-margin primary supply chain. There is clearly not the same pressure on absolute lowest 'cost' of construction, often experienced by clients operating in lower margin sectors, although cost certainty and predictability clearly matter a great deal.

Company X will tend to source directly any large capital items required for a project. The company has, therefore, developed alliances with key suppliers for capital equipment, such as elevators. This allows the company to standardise its equipment and achieve greater leverage in the supply market. The procurement decision is influenced by a number of factors, including: product quality and an analysis of the total cost of ownership (cost in use).

Another item procured centrally is contractors' insurance. The main driver behind this strategic move is that insurance is a very costly item in the United States. So, rather than each contractor buying separate policies, Company X uses its superior buying power to reduce the cost of its contractors' insurances, which it ultimately pays for in any case.

Traditional Procurement

It is probably not fair to apply the term 'traditional' in the case of Company X's approach to construction procurement, as this major client appears to have been quite innovative for some time. In its quest for continuous improvement, the company has experimented with alliance relationships for more years than most. As far back as 1980, it established a single-source relationship with a consulting firm, for the provision of architectural and engineering services. Company X later found that it needed the creative input and innovations from a number of firms and, therefore, elected to develop a 'preferred supplier' approach for this service. The original single-source consultant is included within this arrangement, but is clearly subject to more competitive pressures as a result of this move.

A similar single-source arrangement was set up with a construction management firm at the same time, in order to satisfy all Company X's CM requirements. Again, Company X decided to move away from its position of dependency, and now tends to invite bids from a small number of preferred firms for a specific project.

A New Approach

In moving away from single-source relationships to preferred supplier arrangements for construction-related services, Company X has effectively reduced its position of dependency with its supply base. The company has also realised that it needs to be proactive in getting the best performance from its long-term suppliers. To facilitate this the company now uses a 'team-building' approach on its projects, with the aim of building good working relationships between the long-term players. It believes that this approach helps to break-down barriers and facilitate more effective integration between all parties. The aim is to engender a common understanding and appreciation of each others' roles and expertise.

Drivers for Change

As with any organisation, the fundamental question is 'why change?' It is clear that the resultant impact of several drivers meant that Company X had to move towards more competitive sourcing. The primary drivers included:

- the company's expansion programme;
- the need for speed to market; and
- the need to keep-up with the advancements in new technologies and processes.

These factors meant that Company X had to engineer more effective approaches in managing its construction supply chains. The company needed a supply base with sufficient capacity to deliver its programme of work, on time, and using the latest innovations in construction methods and materials.

In the successful delivery of its projects, it is clear that there are a number of business imperatives. As we have already described, most Company X projects are time-driven, requiring fast-track project delivery. A further critical priority is quality; the building has to be *fit for its purpose*. The standard of facilities required for the main business process requires a very high level of specification. While cost is still an important consideration, it does not appear to be the primary driver; the issue here is more about 'value-added' and cost-certainty than absolute lowest cost. As with any

organisation, there is need for confidence when planning the cost of investments, as variations will inevitably have a significant impact on the performance of the business. The point is, that due to the competitive nature of Company X's primary business, the imperative is to gain speed to market and deliver income from new products as early as possible. In some cases, the premium cost associated with early delivery can be more than offset by the business case for the launch of a new product.

Fit-for-Purpose Supply Relationships

As we have already mentioned, Company X has developed a number of alliance arrangements for the supply of key items of equipment. The company has also developed a number of strategic relationships for a portfolio of construction activities, including building management services and minor works.

The company has established a single-source alliance with a general contractor for minor construction works, which is worth approximately $3–4 million each year. Rates are negotiated within the framework of this agreement. The principle advantage of this approach is considered to be the time saved in the bidding process, which means reduced lead-times and earlier use of facilities. Previously, the appointed contractor won approximately 85% of jobs tendered. It was decided that if the company could maintain control over cost, and thus demonstrate value for money, a great deal of time and resource could be avoided through establishing a close alliance with this firm. Further benefits include the ability to standardise processes and components, and achieve efficiencies and quality improvements through repetitive working.

As with any single-source situation, however, there is a concern with the development of a long-term dependency. Company X, therefore, closely monitors this situation with objective performance metrics, to avoid the emergence of dependencies on this supplier and any potential loss of value for money.

Supplier Selection

Company X operates using a multi-disciplinary team approach to project management. This approach lends a balanced perspective to

the selection and management of its construction suppliers, so that the expert opinion of all stakeholders can be incorporated into the selection decision.

As we have already described, Company X tends to work with a stable group of preferred suppliers for the provision of construction management, project management and architectural/engineering services. Selection of a firm for a particular project is on the basis of an assessment of the responses to the company's 'Request for Proposal'. The RFP document will usually be sent out to a small group of pre-qualified companies, and will include details of the project as well as notification of the criteria being used for selection, including cost, schedule, quality and safety issues.

Proposals are submitted by the CM firms and assessed by the Selection Group using an appropriately weighted scoring matrix. An example matrix is shown in Figure 8.1.

Figure 8.1: Example CM Selection Matrix

Criteria		Score						
Type	**Weighting (1=low, 10=high)**	**CM 1**	**CM 2**	**CM 3**	**CM 4**	**CM 5**	**CM 6**	**CM 7**
Previous experience	7							
Team familiarity	5							
Project team skill/experience	9							
Procurement systems	6							
Cost control systems	6							
Understanding of client requirements	8							
Value analysis	6							
Project programme	7							
Safety	10							
Quality	8							
Technical competence	8							
Innovative proposals	6							
Fee	6							
Completeness of submission	4							
General conditions	6							
TOTAL								

Following this preliminary assessment, the most suitable firms are short-listed and invited to make formal presentations of their proposals. The assessment of presentations will lead Company X to select the firm deemed most suited to the specific project requirements. The emphasis is on value-added service delivery – i.e. the system of weightings means that the balance of quality and price is on the side of project success factors, rather than lowest fee bid. Clearly, Company X prefers to work with organisations which are able to deliver a consistent and quality service, and not ones which cut corners to produce low bids. For example, the client recognises that insurance and litigation can cost much money and, consequently, requires its suppliers to have a number of critical attributes, such as good safety records, and non claims-oriented behaviours.

Relationship Management

As Company X has worked extensively with a single CM firm in the past, and developed a good level of trust, a negotiated master agreement is applied to the management of this close relationship. A more standard form of CM contract tends to govern the relationship with other firms, however, with specific clauses negotiated.

Company X also applies a rigorous process of performance management, to ensure that the project success factors are actually achieved. The appropriate project-specific performance metrics are determined prior to construction. At the initial proposal stage, Company X requests the bidding CM's to propose a range of suitable performance criteria which they believe they should be measured against. These will usually cover a number of critical parameters, including:

- safety (accidents often result in disproportionate additional cost);
- schedule;
- cost;
- project objectives; and
- more qualitative measures, such as project team effectiveness and communication.

It is clear that these project performance measures will largely align with the criteria used in the selection process, so that actual performance can be measured against the assumptions behind the selection process. Furthermore, a project control manual is designed to reflect the particular requirements of each scheme. Progress against the original objectives and cost plan (actual and forecasted) is also continually monitored. IT is used in the form of project management software (Primavera).

Benefits and Problems

Since Company X reviewed its procurement strategies, in order to alleviate its position of dependency, the company has achieved a much improved performance in terms of project delivery. As before, all major projects are completed within schedule. Additional benefits have been delivered, however, in terms of innovative and value-added solutions.

Conclusions

As a regular client for construction, Company X realised that there were benefits to be gained from dealing with fewer suppliers and developing more sophisticated approaches to the management of their performance. In the early days, the company experimented with single-source relationships, but realised that to deliver the required level of performance and innovation, a certain level of competition was required. Preferred supplier relationships were seen as the best way of reducing dependency and delivering these requirements.

The main factors influencing Company X's choice of appropriate supply relationship are the need for:

- innovation;
- standardisation;
- greater economies of scale to improve value for money;
- removal of dependencies;
- short lead and construction periods to facilitate speed to market; and
- high quality research facilities.

There is no doubt that Company X has developed a rigorous approach in its strategies for construction procurement. The biggest challenge facing the organisation is whether it can maintain this 'fit-for-purpose' view and position of control in the construction value chain.

Shimizu's Head Offices in Tokyo

Chapter 9: Shimizu: The Japanese *Keiretsu* Approach in Operation

This case illustrates how Shimizu engineered a powerful position in its supply chain through specialisation around a specific competence – 'design and build management contracting'. The success of this approach was facilitated by its alignment with clients with a regularly high spend in construction, allowing it to leverage its suppliers through the keiretsu structure – a supply network of relatively permanent, but dependent suppliers. This, like the Rover case, is an example of a structured hierarchy of control.

Introduction

Japanese companies have, in recent times, been held as examples of excellence in terms of supply chain management. This is particularly true in the car industry.[1] As a result, the Japanese approach to supply relationships has been copied by a number of organisations in the West, under the guise of 'partnering'. It has been wrongly assumed, however, that this approach prescribes the best way of organising supply chains in all circumstances.[2] This case study will highlight that there are reasons why Japanese companies developed the relational strategies they did and that, as

circumstances change, these approaches must evolve and adapt accordingly.

It may surprise some to find that the changes which are now taking place within the Japanese economy mean that the 'old way' of conducting business is becoming less appropriate. The critical factors which underpinned the successful use of the '*keiretsu*' model are changing to such an extent that many long-established relationships are coming under increasing strain. Two of the key supporting factors identified are concerned with the level of demand and pricing strategies. Regularity of work can no longer be guaranteed in the difficult times currently being experienced in Japan, and there is, as a result, an increasing emphasis on cost reduction, rather than cost certainty. It is entirely possible that we are now starting to witness a slow process of fragmentation in some of the once highly structured supply chains in Japan.

This is the first case in this book to consider the practices of relationship management from the contractor's point of view. There is a sound reason for this. In Chapter 2, the approaches adopted in different countries were described and the nature of power in the Japanese construction supply chain was outlined. It was argued that the large Japanese contractors held considerable power and were, effectively, the 'gate-keepers' of the construction supply chain. This logically provides the most interesting point of entry into the supply chain, to help us to understand how these relationships are managed, both up and down-stream. In this chapter we will explore Shimizu's background and traditional approach to supply chain management and how it is responding to the changing macroeconomic and industry environment.

The Company

The Shimizu Corporation was founded in 1804 by Kusuke Shimizu, a master carpenter, in present-day Tokyo's Kenda Kaji-cho area. In the early 1900s Shimizu evolved into a modern construction contractor. Incorporated in 1937, and listed on the Tokyo Stock Exchange in 1962, Shimizu is now a leading general contractor involved in construction, civil engineering and real estate development projects world-wide.

Total orders awarded in 1995 amounted to ¥1,408.6 billion[3]. This is approximately equal to £8.8 billion (10^9). Most of the Corporation's work load, however, lies in Asia: in fact as much as 98.52% of its turnover in 1995 may be attributed to this region. Only 0.4% of its total work is in Europe.[4] In terms of market segments, most of Shimizu's work load is in building construction (78%), but it is also involved in civil engineering (20%) and real estate (2%). Most of the corporation's clients are in the private sector. A substantial proportion of contracts awarded are as a result of negotiation, rather than competitive tender.

The company experienced a period of substantial growth up to 1993. Since then, however, profits have fallen. It is fair to say that this is a similar problem for all contractors in Japan. A statement in Shimizu's Annual Report for 1994/1995, indicated that the overall business climate in construction continued to be problematic: mainly due to a decrease in private sector construction projects, particularly office buildings and manufacturing facilities, and a continuing contraction in public-sector construction projects.[5] It would appear that the demand for construction in Japan is decreasing as a result of its economy slowing down.

This situation presents an interesting challenge to Shimizu and its competitors: how will they adapt to the changing circumstances of decreasing demand and increasing pressure on price? We will consider this issue later in this chapter, but firstly we should consider the contractor's position in its value chain.

Value Chain Positioning

Shimizu is essentially a 'design and build' management contractor. In common with the other large contractors in Japan, it is able to provide a total construction package for its clients, although it employs specialist and trade contractors to undertake the physical works. The firm believes there are a number of advantages for the client with this approach:

- *Clear, single point of responsibility and contact for the client.* Shimizu takes all liability and risks, assures quality, and controls the organisation and costs of sub-contractors;

- *Lump sum contract.* Often projects are supplied on a 'guaranteed maximum price' (GMP) basis. Variations in cost are only compensated for if significant changes in the design and/or specifications have been requested by the client; and
- Shimizu takes entire *responsibility for target date completion.*

There are also a number of benefits for the contractor in this position in the value chain. Fundamentally, the level of *control* achieved over the construction process, in terms of the schedule and cost of activities, allows the contractor to pursue an effective strategy of profit maximisation. In this position of control, Shimizu is able to employ value engineering techniques on three fronts: with the client, to reduce overall scheme costs; with sub-contractors, to utilise their expertise and innovation; or internally, to reduce input costs and maximise the price received. In controlling the value chain in this way, the contractor requires a great deal of information on costs and performance. Shimizu, therefore, maintains a comprehensive database of productivity and cost information, drawn from the measurement of its sub-contractors' performance. Its project managers are also encouraged to be fairly entrepreneurial in looking for ways to maximise profits.

Shimizu has developed a strong client base, comprising many large, regular private firms. In the commercial and business sector, repeat clients include: Dai-Ichi Bank; Dai-Ichi Hotels; Fukoku Life Insurance Company; Imperial Hotels; Iraq State Oil Marketing Organisation; and Toshiba Corporation. For housing projects: Mitsui Real Estate; Mitsubishi Real Estate; Sumitomo Real Estate and Iraq State Organisation of Housing. Industrial repeat clients include: Sharp Electric Company; Kobe Steel Company; Toyota Motor Company; Johnson and Johnson; Yokyo Electric Power Company; Honda Industrial Company and Mitsubishi Motor Company.

Much of the repeat business is the result of good working relationships, built-up over a period of a hundred years or more. Where a high level of trust exists, clients will tend to procure Shimizu through direct negotiation, and not necessarily on the basis of lowest price. Other factors influencing clients' choice

include: experience of the particular type of work; specific technical aspects, requiring specialist expertise and/or technologies; or an assessment of design aesthetics/functionality of scheme proposals. The assumption is that long-standing relationships enable the contractor to know and understand their respective businesses, factories and systems, etc., which will consequently result in Shimizu producing better projects in terms of quality, time and cost.

For public projects, Shimizu may be procured through the Government's system of nominated tendering, with appointment usually on basis of lowest bid price. This approach is described in more detail in Chapter 2.

The Traditional Construction Supply Chain

Just as Shimizu has strong relationships with certain clients, it also has similar long-standing relationships with many of its sub-contractors. There are approximately five hundred companies within the Shimizu *keiretsu*, known as the 'Kanekikai' – the name given to the family of sub-contractors. Figure 9.1 illustrates this arrangement.

Figure 9.1: Shimizu's Kanekikai

This group includes between 65–70,000 skilled workers. One of the primary suppliers is Kaneko Corporation, a specialist steel erector and sub-contractor to Shimizu for over 110 years. This firm itself employs 750 staff and technicians. Kaneko also has long-term relationships with its strategic suppliers, especially where safety, quality and time are important.

In this hierarchy, Shimizu is ultimately responsible for the successful execution of the works, although it does not undertake any work directly. In this respect it operates as a 'design-build management contractor', with its main activities involving:

- planning of construction work – with respect to quality, time, cost, and safety criteria;
- design and specification; and
- management of sub-contractors.

All sub-contractors are responsible for the completion of their respective work packages on site (to the required standards), and for training their own skilled workers. They, in turn, may also employ other specialist and trades contractors. The role and responsibilities of sub-contractors may be summarised as:

- construction activities;
- preparation and management of programme/method statement for their packages; and
- inspection of works.

The *keiretsu* structure has been viewed as a great source of strength in the performance of Japanese companies. The chief advantage to Shimizu of working with firms in this arrangement is the inherent degree of control and flexibility. We believe, however, that the successful application of this approach is dependent upon the traditional context of Japanese industry: protected markets; high levels of demand; long-term views on planning and investment; emphasis on value, rather than lowest bid; and so on. If companies try to transplant the *keiretsu* approach into a different context, it may subsequently fail. Without the

necessary supporting factors, what is to keep contractors locked in to such a structured hierarchy of control?

This may explain why the Japanese firms have had little success in exporting their services 'wholesale' to other countries. Where they have done so, they have tended to leave their long-standing sub-contractors at home, electing to use cheaper local firms. Depending on the requirements of a project, sub-contractors' managers may be taken abroad, to act as supervisors/trainers.

It is probably fair to say, however, that while Japanese contractors presently exert a high degree of control over their supply base, they are very dependant on the capabilities of their sub-contractors in delivering projects within the required cost, time and quality parameters. This is simply because the general contractors do not physically carry out any of the works directly.

The purchasing department at Shimizu obtains prices and places orders with sub-contractors. It considers its purchasing division to be very strong when compared with that of other contractors. It buys centrally, wherever possible, to gain greater leverage over its supply markets and achieve lower costs. Sub-contractors are selected and appointed on the basis of technical ability, financial check, and package price.

The contract is normally with the employer and is usually a 'General Condition of Construction Contract' (described in Chapter 2), which will be amended as required. All potential problems are negotiated, resulting in special feature clauses related to performance and liquidated damages. These clauses are, however, often deleted if a good relationship exists with the client.

The Emergence of Strategic Procurement?

Shimizu is now attempting to adapt to the changing business drivers acting upon it: the gaps are starting to show in the once tightly interlocked *keiretsu*. For instance, sub-contractors were traditionally selected from the Kanekikai, but the contractor is being forced to seek lower-priced sub-contractors of suitable quality, from outside this extended organisation. What is the nature of the drivers for change impacting on the company?

Shimizu is now under increasing pressure from its long-standing customers to improve performance, in all aspects of cost,

time and quality. The contractor is being 'strongly requested' to reduce the cost of construction, and if it is not able to deliver, then its clients will consider the viability of other contractors. But why are Japanese clients acting in this way?

The main reason for the change in procurement behaviour is that the Japanese economy has been slowing down for some time. Furthermore, its domestic markets are being opened up to a much greater degree of external competition. This means that clients for construction are under greater pressure in their own markets and must look at ways of reducing all of their investment costs if they are to survive.

Given the harsher conditions in its commercial environment, Shimizu is implementing a major three year management plan aimed at increasing the Corporation's competitiveness and capturing market share.[6] It is focusing its efforts on developing a new approach to deliver the necessary client-led improvements, to increase the profitability of its projects, and to reduce general and administrative expenses. Specific responses include:

- restructuring of the company's sales and production systems to emphasise high quality, lower prices and shorter delivery periods; generating new business opportunities through vigorous participation in renovation/maintenance markets;
- increased communication/synergy between divisions to improve the quality of proposals;
- increasing productivity at the production stage, to reduce cost;
- more focused R&D, with a greater emphasis on delivery of direct business benefits and profits;
- cheaper sourcing of materials (global basis); and
- more simple designs.

Shimizu is also cascading the need for improved levels of performance throughout its supply chains. It is understood that it is developing ever-more demanding requirements in the evaluation of its sub-contractors. Factors now being considered include: budget; quality; ability to complete on time; safety record; and, communication/attitude. Perhaps understandably, Shimizu has been quite guarded on the detail of this system.

Conclusions

The key learning points from the Shimizu case are that the historically controlled, structured hierarchy of the *keiretsu* approach was only possible under certain contingent circumstances. One of the key factors in the development of long-term supply relationships has clearly been the cultural values endemic in Japanese society, and the relatively permanent growth in economic performance between the 1950s and 1980s. This environment, and Shimizu's alignment with clients having a high volume and regular spend, made it relatively easy to develop long-term supply hierarchies of control. This was because lowest price was much less important than certainty of supply.

Since the late 1980s these circumstances have changed. There has been a rapid decline in the overall level of domestic demand for construction and, as a consequence, a pressure for lower cost construction. This has placed increasing strain on the long-term *keiretsu* structures and may be resulting in a gradual fragmentation. The cause of this will, of course, be due to the more opportunistic behaviour forced on Shimizu by client needs.

Shimizu has responded to these pressures by innovating in its marketing and procurement strategies as described above. It is likely, therefore, that in the future the company will adopt a much less permanently structured approach to supply chain management. It is to be expected, however, that the destructive character of Japanese business culture – the desire to create structures of dependency and control – will remain within this new environment.

In our view, therefore, the key learning point from the Japanese experience – whether in the automotive or the construction sectors – is not the long-term and closeness of relationships but the capacity to engender ***appropriate structures of control*** in supply management.

Notes

[1] A number of texts have examined this field, including: Womack J. P., Jones D. T. and Roos D. (1990) *The Machine that Changed the World*, New York: Rawson Associates; Lamming R (1993) *Beyond Partnership: Strategies for Innovation and Lean Supply*, Hemel Hempstead: Prentice Hall.

[2] Cox, A. (1997) *Business Success: A Way of Thinking About Strategy, Critical Supply Chain Assets and Operational Best Practice*, Boston, UK: Earlsgate.

[3] Please note the use of American terminology when referring to the quantification of 'billion': the factor 10^9 is applied.

[4] Shimizu Corporation (1995) Annual Report.

[5] Ibid.

[6] Ibid.

Section C:

Better Practice Operational Tools and Techniques for Effective Construction Procurement

Summary

During the course of the research for this book a number of operational tools and techniques were identified as being of significant benefit to clients in achieving improvements at various stages of the procurement process. This section summarises those specific practices which it is believed have most facilitated improved construction performance in terms of better value for money and quality, and reduced timescales. They are, therefore, tools and techniques that all clients and participants in the construction industry ought to understand and be able to operationalise when circumstances allow.

When considering the merits associated with these tools and techniques it is important to remember that they have provided benefits for particular organisations under specific conditions. It may not, therefore, be entirely appropriate to apply them to other situations without a proper understanding of the circumstances under which they can be successfully applied. Without a full awareness of the context, or of the key success factors involved in successful implementation, even the most operationally useful practices can fail and become discredited.

In what follows, therefore, it has been decided that, while it is important to describe empirically how each of these tools and techniques may be applied (and the benefits realised), it is also necessary to establish the context within which each was applied, and the conditions required for effective implementation. For instance, Rover's system of 'Effective Cost Management' relies on the provision of open-book information. This requires a high

degree of trust and openness between client and contractor, built up over a period of time. This simply could not be applied in a one-off situation, where traditional forms of procurement prevail.

For each of the five tools and techniques analysed, a brief introduction to the theory behind the practice is provided. This includes: definitions; conditions for use; potential benefits; limitations; and a description of the process. Case study examples are also cited to illustrate how each tool and technique can be successfully applied in practice.

Chapter 10:
Risk Management

Introduction

There is an abundance of literature available covering the subject of risk management in construction. A full review of the literature is not presented here, merely a summary of the concept, when and how it can be is applied, the potential benefits available from its use, and an indication of how organisations can develop an appropriate strategy for the management of risk in the procurement of their construction needs.

A number of questions spring to mind when one analyses the literature on risk management, as well as the different approaches practised by various organisations:

- is there one 'best' way of undertaking risk management?
- how should risk be quantified?
- is it possible to be scientific about the concept?
- or, should one be guided by intuition and experience?
- how should risk management be integrated within the procurement process?
- what benefits are possible and how can they be realised effectively?

Each of these issues is addressed in this chapter. The main focus, however, must be on how risk management can aid effective procurement. By maintaining an awareness of the full range of potential risks in the procurement process it is clear from our research that the client is better able to achieve any desired business goal. It is also true, however, that business success is rarely achieved by the avoidance or minimisation of risk.[1] In managing risk, any organisation must understand which party is most capable of taking any specific risk, and should then provide an appropriate reward for taking that responsibility. Any attempt by clients to shift 'unwanted' risks on to the contractor without consideration of this principle will undoubtedly lead to disputes and excessive costs being incurred.

Definition and Purpose

Risk may be defined as the exposure to loss or injury as a consequence of uncertainty,[2] or as the chance of an adverse event occurring.[3] The impact of risk can be measured in terms of the likelihood of a specific unwanted event occurring and its resultant consequences.[4] Risk management clearly seeks to mitigate the impact of risks by reducing the likelihood of occurrence and/or the avoidable consequences. Appropriate action will be required to achieve this. For instance, the probability of a risk occurring may be small, but its impact potentially catastrophic. In such a case a decision needs to be made on whether it is better to insure against, rather than ignore the risk. The decision making approach to risk management will be considered in more detail, later.

Risk management has been successfully applied in many industries to ensure that projects are completed on time, within budget, to the required quality, and with the appropriate provisions for safety and environmental issues. Traditionally, the process of risk management was carried out intuitively and was largely a matter of judgement, based on experience. As projects have become more complex and, in many cases, economically more marginal, the need for a more structured approach has grown. It has been argued, therefore, that a more systematic approach to risk management can make risks explicit and therefore easier to manage.[5]

Most commentators make the distinction between risk analysis and risk management. Risk analysis is an essential pre-requisite to effective risk management, involving risk identification, estimation and evaluation. Risk management is concerned with formulating suitable responses to the risks analysed, through planning, resourcing, controlling and monitoring.[6]

Godfrey has argued that the construction industry, its clients and the public at large have suffered the consequences of the failure to manage risk. He believes this neglect directly contributes to long disputes and out-of-control schedules and cost budgets.[7] This view is echoed by Potts, who believes that the occurrence of such problems is unsurprising, when so little attention has been given to the identification and management of risks.[8] Although it is not possible to remove all uncertainties, and neither is it cost effective, a systematic approach to risk management improves the chances of project viability, from the point of view of both client and contractor.

So what are the causes of risk in construction? It is axiomatic that risks will arise from a great many sources. Yeo considers four main sources: external factors; project complexity; incompetent project management; and *unrealistic estimates*.[9] The last of these factors is particularly important when we consider the link between risk management and effective procurement. Perry and Hayes provide a more detailed categorisation of primary sources of risk on projects:[10]

- Physical
- Environmental
- Design
- Logistics
- Financial
- Legal
- Political
- Construction
- Operational

Potential Benefits

Risk management is not just about damage limitation; risk and the opportunity for reward often go together. There will usually be commercial benefits ("added value") arising from risk

management measures taken. Consideration of the potential opportunities arising requires little additional effort and can aid the process in providing a more holistic view of consequences.[11] Godfrey considers the following benefits:[12]

- better control of certainty;
- greater confidence;
- better briefing;
- improved decision making;
- more effective prioritisation of resources;
- team communication/motivation;
- reduced costs of risks impact;
- realistic estimates;
- balance sheet protection.

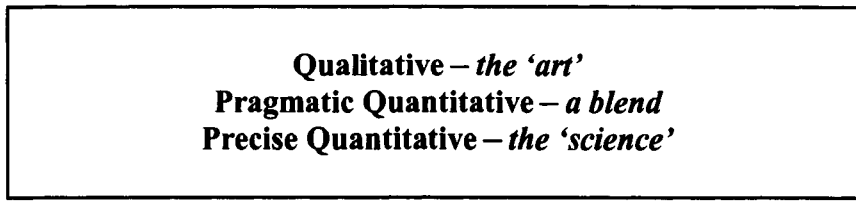
Approaches in Risk Management

Whichever basic approach is employed, the overall framework for managing risk is largely similar. Potts recommends three basic steps:[13]

- Identify all risk factors that are likely to occur on a project (e.g. unforeseen ground conditions, effects of inflation, variations in interest rates, likelihood of change, default of contractors/sub-contractors etc.).
- Analyse the risks – understand the likelihood and extent of the most significant risks.
- Decide on the most appropriate management response for each risk/combination of risks: avoid; reduce; transfer; retain (insure). Decide which party is most appropriate to decide and manage each of the risks identified.

This process provides the foundation on which all approaches to risk management are essentially based. Differences occur, however, in the way in which the issue of risk quantification is dealt with. It is possible to classify the different approaches to risk quantification into three broad schools of thought.

Figure 10.1: Three Schools of Thought in Risk Quantification



The first methodology is the *qualitative* approach, which seeks to identify the most significant risks and provide management with a focus for appropriate action. At the other end of the spectrum, there is *precise quantitative* risk management, which attempts to quantify risk in exact terms. There are, however, a number of approaches in between these two extremes which contain both qualitative and quantitative aspects. These may be classified under the heading of *pragmatic quantitative* approaches to risk management. These address the need to quantify risks on projects, but recognise the limitations of trying to be too precise, when there are too many unknown factors involved. This methodology can provide a balance between the need for accuracy and what is practicable in the specific circumstance.

Risk Quantification

The impact of risk is normally measured in two dimensions: in terms of the likelihood, or probability of an unwanted event occurring; and, in terms of the consequence, or severity of the specific outcome.

Impact of risk = likelihood x consequence.

As we have already stated, the three schools of thought apply different methods for quantifying risk. If we analyse each of the three broad approaches in turn, the differences in the methodologies become apparent:

- **Qualitative:** both likelihood and consequence are measured in terms of fairly subjective 'low', 'medium' or 'high' ratings. The impact is effectively an arbitrary balance of the two variables. This approach appears to offer more of an aid in risk prioritisation, than effective risk management.

- **Precise Quantitative:** the likelihood of a particular risk occurring is measured in terms of its statistical probability. The consequence is measured in terms of a range of costs associated with these probabilities. The impact is quantified in terms of the *most likely cost* for a specific risk, i.e. the cost associated with the outcome with the highest probability of occurring.

- **Pragmatic Qualitative:** the likelihood may be measured using a numerical rating, for example a percentage scale of 1 to 100%. The consequence may be similarly measured, on a scale of 0.1 (insignificant) to 1.0 (abortive). The resultant impact is measured in terms of a combined rating, or an *average contingency sum* for that particular risk. The contingency figure may be derived through multiplying the probability (%) by the severity factor to give a combined risk factor, which is itself multiplied by the 'estimated value' to be expended, should that risk occur. An example of a risk register involving this approach is given in Figure 10.1.

Figure 10.1. Example Risk Register (AMEC Civil Engineering)

Nr	Risk	Action to Eliminate	Owner of Risk	Value (£k)	Residual Risk			Contingency Allowance (Value x Factor) (£k)
					Probability (1 to 100%)	Severity (0.1 to 1.0)	Factor (PxS) (%)	
1.0	WEATHER							
2.0	DRAINAGE							
3.0	CONCRETE							
4.0	LINES/JOINTS							
5.0	OPERATIONAL							
6.0	WORKMANSHIP							
7.0	QUANTITIES							
8.0	PRICE CERTAINTY							

Table 10.1. summarises the different approaches to quantification. These tend to focus on cost and time as the principle dimensions of measurement. There are, of course, other ways of measuring the dimensions of risk. The likelihood, or probability, of a risk can also be expressed in terms of the number of 'events' per annum, or in a greater level of detail, for example, such as the number of defects per kilometre of steel produced.[14] The overall impact of a risk, however, is more usually expressed in monetary terms.

Table 10.1 Approaches to Quantifying Risk

Approach	Likelihood/ Probability	Consequence/ Severity	Impact
Qualitative	Low, medium, or high	Low, medium, or high	Subjective balance of the two variables
Precise Quantitative	Statistical probability	Range of costs for associated probabilities	Most likely cost
Pragmatic Quantitative	Numerical rating (e.g. 1–5, or 1–100%)	Numerical rating (e.g. 1–5, or 0.1–1.0)	Combined rating or average cost.

The issue concerning which approach to quantifying risk is best appears to cause a fair degree of debate. There are some who argue that project managers should seek to identify risk and measure financial consequences more quantitatively, in order to generate greater financial certainty.[15] There are others who suggest, however, that the aim is to get the answer approximately right and not to get too distracted with number-crunching, which may result in getting the answer precisely wrong.[16]

Which Approach is Best?

The answer to the question of which methodology is the best is relatively straight forward: they are all valid approaches, but each one may be best suited to a particular set of circumstances. It is necessary, therefore, to think through what is fit-for-purpose for each specific application. This will depend on *what it is that one is*

aiming to achieve with risk management, and which of the various approaches will most efficiently deliver the desired end result. There is little point in using a 'sledgehammer to crack a nut', but the approach must be effective. Thompson and Perry consider that the selection decision will be based on the following factors:[17]

- type/size of project;
- information available;
- cost/benefits;
- experience/expertise of analysts.

So, how should one think about what is appropriate? Two of the most important criteria under consideration will often be project value and the complexity/magnitude of risk. The nine-box matrix in Figure 10.2 illustrates how one might choose to prioritise resources in terms of the relative benefits to be gained, against the level of input for each approach. For high value projects involving highly complex risks, it is important to accurately quantify the most likely impact of risks. In such circumstances a quantitative approach may be considered justified. On the other hand, for projects of low value with less complex risks, there is probably little to be gained in attempting an exact quantification of risk. A qualitative approach would be more appropriate: it may be sufficient to understand the risks, what should be done to manage them, and how they should be apportioned. Finally, when there is a need for a degree of understanding of the financial impact of key risks, but where insufficient data/information/resources exist to *accurately* quantify risk, a pragmatic approach may provide the best solution.

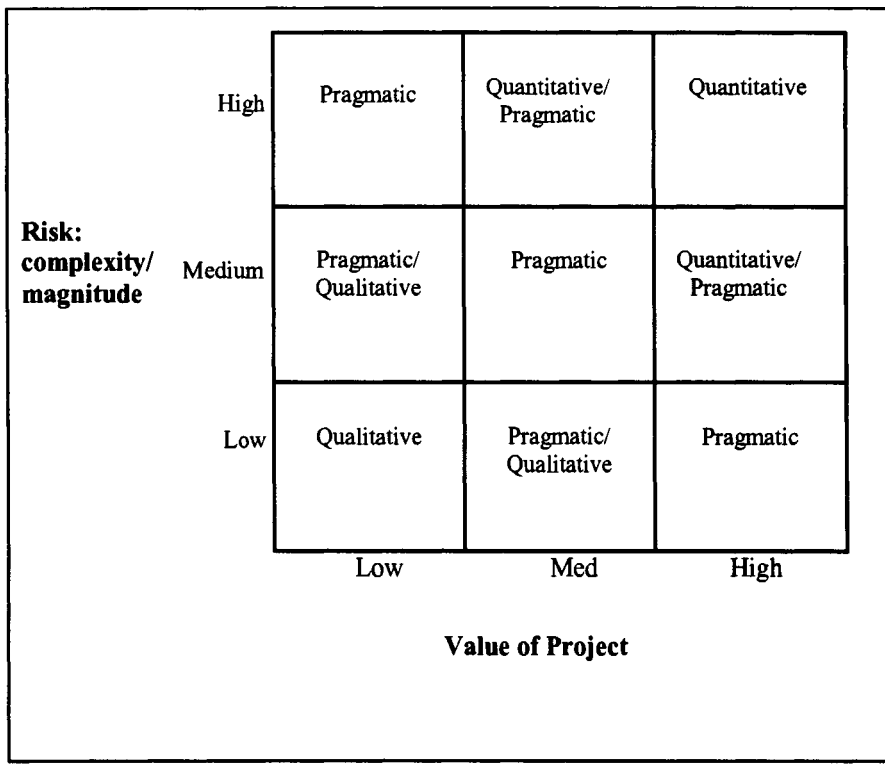
There are other factors that need to be considered when thinking this decision through. Are we using risk management to:

- gain a basic understanding of the likely risks?
- help prioritise risks for action?
- help focus on the management actions required?
- determine who is best placed to manage each risk?
- provide a tool for monitoring progress and trends?

- or, perhaps to aid the project manager in the quest for more accurate cost planning?

Whichever approach to quantifying risk is deemed most suitable for a particular need, there is one major limiting factor to be considered: *are the necessary resources available?* It is clearly necessary to have the required level of information, data and expertise for the chosen risk management approach, but what about the time and investment required? Is the time and money readily available to develop an effective approach? If the necessary resources are not available then, when the effective management of risk is considered to be critical to project success, plans must be put in place to fund the required resources. If this is not done then risk is not being managed, but ignored.

Figure 10.2: A Selection Matrix for Risk Management



An Aid to Effective Procurement?

There is no doubt that a systematic approach to risk management is a pre-requisite for effective procurement management. There appear to be two main linkages between risk management and the procurement process:

- cost management; and
- contract strategy.

Thompson and Perry recognise this point, and argue that effective risk management provides a better, more realistic approach to defining risk allowances, in terms of calculating contingencies and tolerances.[18] If risks can be quantified in financial terms, then it is possible to provide a more effective approach to cost management. Rather than applying a global, all-encompassing figure for 'risk', it brings discipline into the estimating process, forcing the project manager to differentiate between how much work items should cost to construct, and how much money is apportioned to the management of risks. Through establishing a range of contingency values it is possible to gain a better idea of client and contractor risk exposure.

Risk management may be used to establish project priorities, the roles of the various parties in the process, and the number/type of work packages to achieve these aims. Thus, the key issues concerning contract strategy can be addressed:

- division of responsibility;
- terms of payment;
- basis for contractor selection;
- degree of client control/involvement; and
- the most appropriate allocation of risk.

As Yeo correctly observes, the construction industry has a history of frequent and excessive cost over-runs, due to poor contingency management.[19] He calls for a less subjective approach to contingency allocation, rather than the provision of meaningless global percentage values, which he finds are mainly based on an estimator's perceptions of project risk. This, he contends, will provide for more effective cost management. To facilitate this

approach he proposes a 'knowledge-based' system, which effectively builds up a database to capture the knowledge, experience and judgement of an expert practitioner. This level of information would certainly prove valuable in project risk management, but is this approach always practicable?

Figure 10.3: Inter-relationship Between Cost, Risk and Design Management.

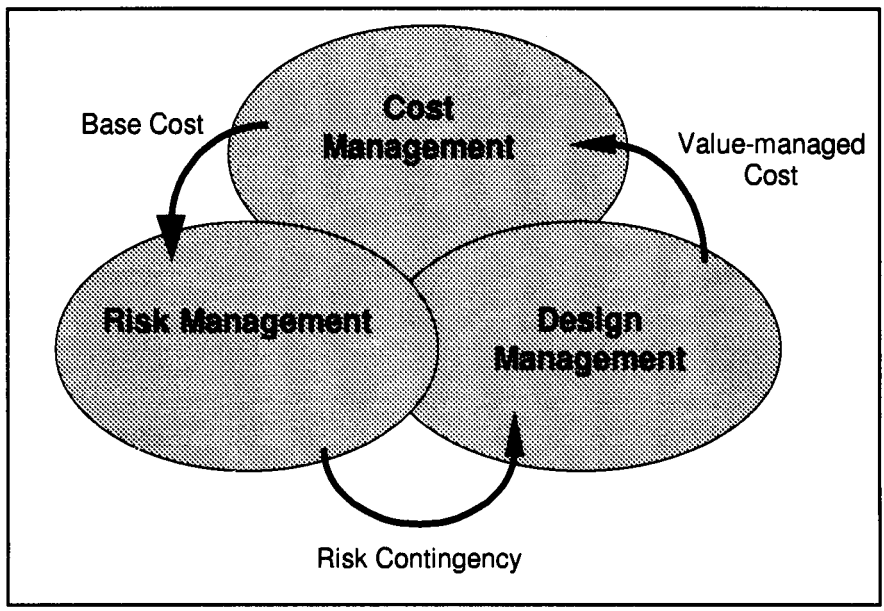


Figure 10.3 shows the interdependent relationship between cost mangement, risk management and design management. The starting point is with preliminary design. This is costed and value-managed to fit within initial budget, providing the 'base' construction cost. The process of risk analysis leads to the calculation of risk contingencies. The results of this exercise then feed back into the design process and, by further value engineering, to bring total cost back in line with budgetary requirements. These three disciplines are all essential and inter-related parts of the procurement process. This is very much the hinge-point of the Mace approach, which will be described later.

Cost Management

The importance of risk management in more effective cost management and procurement cannot be over emphasised. The limitations of the traditional approach to cost planning are now well known. If an estimator prices work items in isolation, and adds a subjective element for contingencies (perhaps 10%). Then the estimate will be subjectively rather than objectively based. If, then, the designer adds a further 5% to cover any design contingencies the result will be a high initial estimate, incorporating an unnecessary degree of financial uncertainty. This effectively means that the client has a higher amount of capital set aside for the project than is probably necessary.

A more accurate appraisal of contingency sums will give clients greater cost certainty on the amount to be spent directly on construction works and, therefore, provide for a more effective deployment of resources. This could be achieved through a reduction in costs on a given project, or through an increase in the specification of the project. The link between effective risk and cost management is highlighted in the better practice approach applied by Mace Ltd.

The Mace Approach to Risk Management

Mace is an independent professional management consultancy offering a flexible range of construction and property related services. These may be essentially divided into three main areas of activity:

- **Strategic management**, involving the investigation of client needs and the establishment of a suitable framework for funding, design and project strategy.
- **Project management/consultancy**, acting directly as the client's agent on projects.
- **Planning supervisor services**, in line with the CDM regulations.

In its role of 'construction manager' Mace is effectively a regular buyer of construction services, providing the intelligent interface between constructors and end-users in the construction

supply chain. Regularity of client work-load, albeit from different sources, allows Mace to develop the required expertise in defining and managing specialist/trade packages with a regular pool of suitable suppliers. This is believed to contribute towards closer working and a more integrated approach to the construction process. As an integral part of its approach to construction management Mace has developed an effective system of risk management. This is not a stand-alone process, but is closely linked with the effective management of costs and design.

To enable the more effective management of costs Mace uses an 'open-book' approach with its contractors. This allows the company to understand the actual costs of construction, as well as provide a basis for understanding what is a suitable level for profit and overheads. Furthermore, by isolating the actual costs from the risk elements, Mace is able to accurately derive a minimum and maximum range of costs for a scheme. Effectively, the minimum costs will be those associated with the construction items only. The theoretical maximum will incorporate construction costs and the predicted additional expenditure incurred, should all risks have a maximum impact. The most realistic scenario is represented, however, by the construction costs plus a risk apportionment based on the calculated impact (likelihood and consequence).

The Mace process of cost management involves a number of basic steps. The initial cost plan is tested in the market place, through discussions with suitable trades contractors, to more accurately refine budget estimates. This process is also facilitated by the open book arrangements with regular contractors. At this stage there is no actual obligation for any firm to undertake the work, or indeed for Mace to award a contract to any particular contractor, although they would have the opportunity to bid. This provides a greater certainty for the client in relation to the validity of the overall cost plan. All risks are also discussed with the contractors (engineering and financial) in order to refine the risk elements. The project, therefore, has the advantage of commencing with an agreed and verified cost plan, instilling confidence in all parties. This process involves the whole team, raising the awareness of all to the requirements and issues concerned. The cost plan is monitored and up-dated on a monthly basis. The client is made aware of all construction costs, any variations prior to

expenditure, and all risk items expended/future projections. Cost meetings are arranged every two weeks in order to discuss any potential changes and variations and to keep all parties informed.

Mace defines risk management as the process of identifying and managing all issues relating to the project for which there is some level of uncertainty. In operationalising this broad concept, Mace applies an approach which employs three levels of complexity:

- **Strategic Risk Management:** An assessment of the macro-issues affecting a project to give an overall representation of project/development risks. These may include: financial benefits; timing; planning; government intervention/legislation; etc.
- **Construction Management:** A more detailed, but pragmatic level of assessment involving a blend of qualitative and quantitative techniques. This provides a detailed analysis of the important risks affecting the construction project.
- **Computer Simulation of Risk:** Similar to the 'construction management' category of risk assessment, but with a greater emphasis on quantitative analysis, incorporating the 'monte-carlo' simulation. This method is particularly suited to 'higher risk' developments, where issues are complex and inter-related, and the potential repercussions high. In these scenarios more control of project risk is, therefore, required. Various proprietary software packages are available, and Mace uses a system called 'Opera'.

Process

The basic principle behind any approach to risk management is to attempt to identify the likelihood (probability) of certain risks occurring, and their likely impact if they did occur. Following the analysis, the necessary steps must be taken to manage the identified risks. There are a number of courses of action which may be followed in minimising the impact of risks, including: providing a contingency allowance to mitigate the effects; ignoring them as insignificant; or (if possible) managing them out altogether.

Mace considers that the practice of risk management should be closely linked with the complementary disciplines of cost management and design/value management, within the procurement process. The cost management exercise provides an accurate assessment of predicted construction costs, termed the 'base cost'. As risks are identified, further elements of cost are added, in order to provide appropriate contingencies. The outputs of the detailed consideration of these costs will ultimately have an impact on the value management exercise within the design process. Typically, a number of fundamental questions will be raised:

- is the base cost reasonable?
- can it be reduced by design?
- what are the risks involved?
- what are their likely cost impacts?
- can they be reduced/eliminated by design?
- and so on.

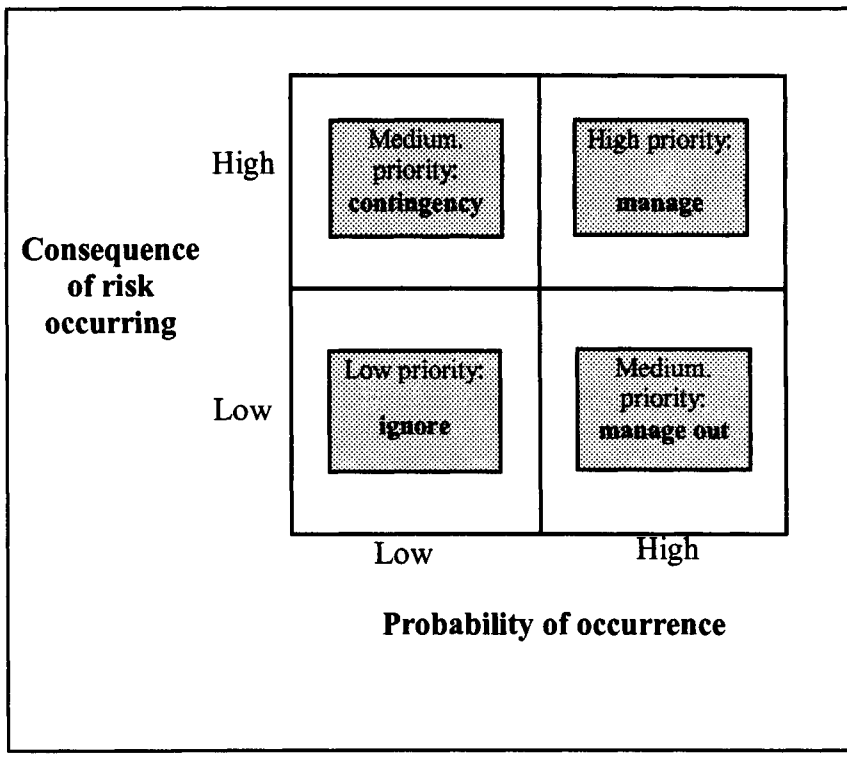
The generic process of risk management followed by Mace is described in five basic steps. It is important, however, to be aware of the context within which Mace developed its approach. Mace originally started life as a company dedicated to the use of the 'construction management' procurement system. The framework for risk management was consequently developed to integrate with this system, and the involvement of parties at the various stages identified reflects this. Although some modification may be required, this generic approach is considered to be valid for all construction projects.

- **Step 1: Structured Brainstorming.** An open and honest workshop to identify project specific risks, under the general categories of risk usually encountered. White boards are used to display clearly the risks identified to all workshop participants.

- **Step 2: Prioritisation.** Risks are prioritised in an attempt to limit management effort to those risks that may be effectively and economically managed. Each risk is categorised in terms

of its probability of occurrence and magnitude of impact. A maximum of the top thirty risks will then be selected for management. This figure is considered by Mace to be the optimum number of risks that can be effectively managed by any project team. Risks with low probability and low impact are effectively ignored, as it is not considered cost-effective to manage them. Furthermore, any risk considered to be too difficult/costly to manage may also be ignored. Figure 10.4 illustrates the general principles behind the initial prioritisation process.

Figure 10.4: Prioritisation and Management of Risks.



- **Step 3: Assessment of Impact: probability and consequences.** The risks identified as significant and, therefore, to be managed are given a more detailed assessment. Risk probabilities and impacts are scored on a scale of 1–10,

where 1 indicates a low value. The two values are then aggregated through multiplication and expressed as a percentage. The 'scientific' risk scores are used in the calculation of appropriate contingency sums.

- **Step 4: Risk Verification.** Individual team members are then interviewed by the workshop facilitator in order to verify the risks to be managed. This helps to clarify the nature of risks, identify other concerns, and mitigate the effects of 'group-think'. Following validation, a risk register is produced. A typical example of the register is re-produced in Figure 10.5.

- **Step 5: Management Action.** The project team must then establish the extent of management action to be undertaken. Certain decisions are required on such issues as: the level of tracking and re-assessment of risks; who should carry the risks; should they be contracted-out, designed-out, or insured against? A consensus recommendation is reached by the team, although the final decision rests with the client.

Generally, the risk register is reviewed every month at cost management meetings. The process requires a careful allocation of risks, to those parties who are best able to manage them. It should not be a case of abdicating responsibility for risk, passing it down to the sub-contractors. Mace, therefore, engages a 'team emphasis', involving the trade/specialist sub-contractors at the earliest stage possible. It is also important to identify and describe the project risks in the bid documents before individual packages of work are put-out to tender. Tenderers are then able to accept the risks and price for them accordingly. This minimises the number of 'surprises' on a project, which may otherwise lead to disputes, delays and cost over-runs.

Figure 10.5: An Example of a Risk Register (Mace).

Nr	Description	Likelihood					Impact					Rating (2x'L' + 3x'I')					Owner of Risk	Status	Strategy	Management
		1	2	3	4	5	1	2	3	4	5	This Month	-1 Month	-2 Month	-3 Month	-4 Month				
1.0	DESIGN																			
2.0	COST																			
3.0	QUALITY																			
4.0	SAFETY																			
5.0	ENVIRONMENT																			
6.0	CLIENT																			
7.0	FINANCE																			
8.0	PROGRAMME																			

Benefits

Mace believes it has achieved many benefits with its approach to systematic risk management, including:

- Greater cost certainty and fewer shocks. Identified risks can be priced for and managed accordingly. The client, therefore, has greater confidence in the final out-turn cost, and can manage investments more effectively through a better allocation of resources.

- The potential for savings is high if risk does not occur, or if it is managed out more efficiently than was originally allowed for. As a result this will result in less expenditure and can lead to a sharing of savings with clients.

- Cost visibility allows the client to know where any contingency sums are located, how they were derived and their intended use.

- The cost of risks can be tracked over time, providing greater visibility to the process.

- The approach is rigorous but is also relatively easy to understand and use, compared with other methods of risk analysis (e.g. Monte Carlo Simulation).

- The approach provides for team involvement, and helps to concentrate minds at the beginning of any project.

Limitations

- The approach may be open to a degree of subjectivity, although team assessment can minimise these problems.

- There is no clear empirical measures of cost benefits

- It can appear to some clients that Mace is adding costs to the construction process (i.e. the contingency sums in the risk register). In reality, however, the process separates the uncertain from the certain costs, that would have remained hidden in more global contingency calculations using more traditional methods.

Overall, while it might be possible to improve the system by providing a feedback loop in the process, through the provision of a database of risks, with the estimated and actual contingency costs, to establish how accurate/effective the process has been in operation, it is clear that the Mace system provides a systematic approach to risk management. The methodology involves a judicious mix of qualitative and quantitative criteria, and allows the company to provide its clients and supply chain suppliers with some degree of certainty in the often highly uncertain world of construction. It is clear that having such a structured methodology in place is essential for all serious participants in construction supply chains.

Notes

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[2] Chapman, C. B., Cooper, D. F and Page, M. J. (1987) *Management for Engineers*, Chichester, John Wiley & Sons.
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[5] Ibid.
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Chapter 11: Supplier Appraisal and Development

'Nowhere in business is there greater potential for benefiting from.... interdependency than between customer firms and their suppliers. This is the largest remaining frontier for gaining competitive advantage – and nowhere has such a frontier been more neglected.'[1]

(Drucker 1982)

Introduction

Drucker highlights the massive scope for gaining competitive advantage through working with the supply base. Hines also argues that the activity can be transformational, in that it can turn problems into opportunities, weaknesses into strengths and costs into profits.[2] Yet, this area is only just starting to be explored; British industry appears to be very uncomfortable with the concept and practice of developing suppliers. The traditional approach in construction, as in many other sectors, is to keep suppliers at arms-length and only communicate within the strict terms of the contract. Of course there have been individuals and companies who have taken a more pragmatic approach, but they have done so in spite of the system, applying common sense to relationship management. On the whole it is probably fair to say, however, that

the potential contained within the supply base remains largely untapped.

In this chapter we are concerned with appraisal and development of suppliers in the construction process. The term 'suppliers' is used in its broadest sense here, as it could refer to any form of contractor, consultant, sub-contractor or materials supplier at any position in the supply chain.

It is important to note that supplier appraisal and development are not the same thing. Appraisal involves some form of assessment against a desired standard. Hines argues that supplier development is the process where a partner in a relationship modifies or otherwise influences the behaviours of the other partner with a view to mutual benefit.[3] This involves two activities:

- supplier co-ordination – moulding the entire supply base into a common way of working; and
- individual supplier development – to help improve the strategies, tools and techniques used by particular suppliers.

Traditional Approaches

The traditional methods used in the procurement of construction works usually involve some form of pre-qualification. This activity may be described as supplier assessment; each potential supplier is assessed against a number of pre-determined criteria, in order to establish whether it is capable of performing the required task, should it be successful in winning the contract. A suitable number of appropriate firms will then be invited to bid in line with the selected procurement strategy. A further evaluation is undertaken once tenders have been returned. The level of sophistication of such assessments will vary depending on the expertise of the client and its professional advisers, as well as the particular requirements of the project.

The FIDIC publication Procedure for Evaluating Tenders for Civil Engineering Contracts gives useful guidance on this activity.[4]

Three main areas of assessment are brought together for a holistic analysis:

- technical evaluation;
- financial evaluation;
- general contractual and administrative evaluation.

Potts points to more strategic approaches in identifying which bid presents the best value for money option.[5] He proposes a quantitative model incorporating all criteria which could impact on the ultimate financial performance of the project. Table 11.1 illustrates the factors which may be considered:

Table 11.1 A Model for Tender Evaluation

General Factors on Company and Past Performance		Specific Factors on Current Bid	
Criteria	Weighting (%)	Criteria	Weighting (%)
Financial standing	20	Qualifications/experience of key personnel	20
Experience and past performance	20	Own key labour	10
Quality management systems	15	Major items of own construction plant	10
Reputation for achieving programme completion	15	Programme proposals	10
Reputation for litigation/claims	20	Method statement and temporary works	20
Safety record and policy	10	Contractor's pricing strategy	20
-	-	Adequate capacity	10
TOTAL	**100**	**TOTAL**	**100**

Source: adapted from Potts (1995)

This methodology is clearly based on a one-off project approach to procurement and is, therefore, not concerned with supplier development. Within this approach it is assumed that the market will naturally provide for all of the required supplier development. This means that the client will only receive from suppliers as much as is prescribed in the specification, because

there is no long-term view taken of how performance can be enhanced in the future.

Dand and Farmer recognised this weakness in 1970 and argued that the selection of good sources of supply was of major importance.[6] They argued that sound sourcing decisions will pay regular and long-term bonuses, but that the proportion of time dedicated to this key decision was far less than that invested in other less critical activities. They were ahead of their time with this observation, but sadly the predicament still remains today. Only now are some clients and contractors starting to realise that traditional forms of supplier vetting do not deliver the quality results that are required for effective construction. Some enlightened clients such as BAA and Rover have established quite sophisticated approaches to supplier development. Particularly impressive is Rover's RG2000 supplier development. This interesting case is described in detail later in this chapter.

Strategic Development

In recognition of the growing role of suppliers to the successful performance of any business, there is a need for an objective assessment of suppliers and their performance in meeting the expectations of the client. Clearly, it is not sufficient for suppliers to be able to meet only the standards of today. Increasingly buying organisations want suppliers to be dynamic enough to satisfy long-term requirements in the future. This naturally requires a degree of knowledge of the strong and weak points of current supplier performance, as well as an understanding of their potential capabilities.[7]

The key question facing any client is what should policy be towards suppliers? Should the organisation be focused on the systematic improvement of suppliers, or should it be aiming to eliminate particular supplier relations. Van Weele suggests that organisations should move towards co-operating with and ensuring the development of its key suppliers, to ensure the delivery of required quality standards.[8] To facilitate this he proposes that buying organisations should establish a communication policy, based on the principle that suppliers are important human assets to

the company. The aim is to work with the best suppliers, and to benefit from supplier innovations. This process is described below.

Supplier Development Process

Van Weele considers four levels of information abstraction:[9]

- product level – to establish the quality of the finished product;
- process level – to scrutinise the production process that supports product delivery;
- quality assurance system – to check the adherence to agreed procedures;
- company level – this is the highest level of assessment, and aims to establish how competitive the supplier will be in the future, through consideration of quality, financial and management aspects of company performance.

What methods should be employed? Van Weele proposes a mixture of subjective and objective tools and techniques: the first steps are concerned with assessment, the second steps focused on development. It is argued that the former is a pre-requisite for the latter because it is clearly not possible to know what to develop until a rigorous assessment has been carried out. The key steps are described below:

1. **Spreadsheets:** to facilitate the systematic capture of data which will allow comparisons of critical evaluation criteria.
2. **Personal assessment:** it is possible to make valued assessments where close relationships exist and where the assessor has experience of the supplier concerned.
3. **Vendor ratings:** objective assessments are possible using a range of quantitative data, including: price; quality; time performance; reliability; and other key measures. This approach appears to be relatively straight forward, although such systems can be difficult to establish and manage due to the amount of data required.

4. **Supplier audit:** this approach involves periodic visits to suppliers in order to assess their relative strengths, weaknesses and progress towards improvement.
5. **Should-cost approach:** this is a fairly extreme technique, where the client analyses the price and its various components to establish where cost improvements are possible. Negotiations then ensue between buyer and supplier to agree targets for cost reduction and how this may be achieved.

Steps 1 to 3 are clearly focused on supplier appraisal, which steps 4 and 5 are clearly focused on supplier development.

Effective Procurement

By this process of systematic collection of supplier performance data the buying organisation is able to negotiate strict agreements concerning required improvements in cost, time, quality and other performance criteria.[10] This is an absolute requirement for effective procurement management.

The benefits of this approach include:[11]

- on-going cost reduction;
- supplier innovations to improve product/process performance;
- improvements in the systems/procedures of the buying organisation.

Hines *et al.* propose a decision tool to help companies identify where these types of improvements can be made, and the likely costs and benefits involved.[12]

Appropriate Application

The technique of supplier development is clearly not, however, appropriate in all circumstances. This is because the full development programme is costly, and is only likely to yield suitable benefits with strategic supply relationships. The primary reason is because the approach requires a high degree of co-ordination and co-operation. The application of supplier development, therefore, clearly assumes the presence of relatively

long-term relationships. The process requires the application of scarce and valuable human resources to achieve continuous improvement in the performance of buyer and supplier alike.

Hines *et al.* argue that the approach is always valuable because their research shows that their empirical testing has shown that even in successful companies, the cost of supplier non-performance is so great as to exceed pre-tax profits.[13] They contend, therefore, that a cost–benefit ratio of 23:1 makes supplier development a worthwhile investment. In general one cannot disagree with this conclusion but to say that it can be beneficial does not mean that organisations should undertake the practice of supplier development with every one of their supply base. Clearly, as the Rover case below demonstrates, it will only be appropriate when there is a regular spend for products and services which are of significant importance to the buying company.

RG 2000: Supplier Development Programme[14]

Rover has recognised that the true benefits of operating a collaborative approach can only be gained when dealing with suppliers who are of the right calibre. At present, Rover feels that the construction market is not sufficiently mature to rely 100% on this form of procurement. Some suppliers are not yet able to adapt to the cultural and management demands of this business philosophy; they are often too entrenched in the adversarial and opportunistic ethos associated with traditional construction procurement.

Rover has, therefore, concentrated its use of preferred supplier relationships in strategic areas of procurement, in the knowledge that 80% of its total construction spend lies with approximately 20% of its supply base. Suppliers were assessed in terms of three categories of spend: (A) ***strategic suppliers***, who were awarded long-term arrangements; (B) ***non-strategic suppliers***, who were procured through more arms-length relationships; and (C) ***specialist suppliers***, who were also awarded long-term supply agreements. Initial selection for long-term supplier status in construction is, therefore, purely undertaken on the basis of the volume and/or strategic importance of spend.

Two contractors were originally selected by Rover to work under 'strategic' preferred supplier arrangements for capital construction projects: SDC Builders Ltd of Bedford and Anglo-Holt of West Bromwich. At the time Rover did not want to be exposed to the dangers of single-sourcing, and felt that its capital programme would yield sufficient work for two medium-sized building firms. By mid-1995 it was becoming clear that the two firms initially chosen did not have the capacity to cope with Rover's increasing investment plan. The selection process was re-commenced to find a third construction firm, in order to cope with the increasing workload and to induce more competition within the supply base.

Eight companies were initially invited to make formal presentations to Rover. Each company was asked to provide information on their experience of working in manufacturing environments, any partnering/open-book work, and their organisational culture. From this initial presentation Rover established a short-list of three firms, which would undergo their full one-day 'RG2000' supplier assessment. This process led eventually to the appointment of Birse Construction Ltd.

RG2000 is a week long assessment of the supply process, and is carried out with each strategic contractor in order to determine their relative strengths and weaknesses. The system was developed by Rover, drawing on experience gained while working with consultants. Rover concentrates on areas of weakness and coaches each firm on the potential improvements that they could make in their operations. This may result in external specialists being commissioned to assist the firms in improving their business performance. The continuous improvement process is not all one-way; if suppliers feel that improvements are required in Rover's process, they may also suggest these. This requires a completely different cultural approach to the relationship between client and contractor; co-operation rather than arms-length opportunism is what is required in this environment.

Rover Group openly acknowledges the value of its suppliers in achieving its business aims. In the pursuit of 'total quality' Rover has recognised the need to work with its entire supply base to establish methods for ensuring continuous improvement in all aspects of performance. This is especially so in terms of its long-

term strategic supply arrangements, including its construction contractors. Rover has, therefore, established a supplier development programme, known as 'RG 2000', which defines the minimum standards for supplier performance in a number of key areas. These are the strategic issues that Rover believes have been seriously overlooked.

Table 11.2: Supplier Categories

Category	Product/Service	Supplier Development Strategy
One	Proprietary/jointly designed product or service	Priority: full compliance with RG 2000
Two	Product or service requiring comprehensive project management	Priority: full compliance with RG 2000
Three	Product or service supplied on frequent basis, but not requiring comprehensive project management	Recommended: conform with Supplier Business Specification RG 2000, Part 2.
Four	Product or service not in general supply, but infrequently required to meet a particular need	Recommended: conform with Supplier Business Specification RG 2000, Part 2.

In addition to requiring its suppliers to be accredited to BS 5750 (or EN 29000/ISO 9000), Rover assesses suppliers' attitudes towards employees and the philosophy of 'total quality'. Rover wishes to understand how suppliers determine their corporate strategies and organise their businesses to best satisfy their customers' requirements. The process is also dynamic, and not merely an audit. The emphasis is on both Rover and its suppliers continually reviewing their approaches to management, planning and cost reduction, to ensure long-term growth and the ability to invest for the future.

Although Rover reserves the right to assess any of its suppliers, it tends to concentrate its efforts on the more strategic areas. These are known as Category One and Two suppliers. Table 11.2 summarises these categories, and the approaches to supplier development used in each.

Supplier Specifications

Project Management

Where project management is required, RG 2000 lists a number of areas where suppliers will be assessed. Although a fairly detailed check-list, the following outlines the broad areas for assessment:

- the project manager;
- feasibility review;
- project planning and review programme;
- design and development programme;
- review of application;
- process planning;
- control plan;
- manufacturing facilities;
- testing;
- human resource planning;
- sub-supplier control;
- quality systems and procedures;
- installation and commissioning;
- control of non-conforming products;
- systems and software;
- project cost management; and
- quality cost analysis and review.

The above list is neither fully exhaustive nor fully inclusive. Rover applies a fit-for-purpose approach, with appropriate measures developed to satisfy the required attributes for the specific works or services under consideration.

Total Quality Improvement

Rover itself embraced the principles of Total Quality Improvement in 1987. Total Quality is defined as total customer satisfaction at the lowest achievable total cost. It is considered that this will only be achievable through teamwork, communication and common objectives. This can not be achieved by Rover alone. The adoption of Total Quality philosophies by suppliers is, therefore, considered mandatory. Rover wishes to do business with self-motivated

quality suppliers, able to work in a spirit of co-operation and mutual benefit. Common goals are described as ever increasing customer satisfaction, whilst rigorously reducing total cost. Rover recognises that there is no one 'best' approach to Total Quality, but there are a number of guiding principles, including:

- **Philosophy:** prevention, not detection of defects.
- **Approach:** management-led initiative, encouraging others.
- **Scale:** everyone is responsible for quality.
- **Measure:** total costs of quality must be established.
- **Standard:** right first time.
- **Scope:** company wide.
- **Theme:** continuous improvement.

The aim of this approach is to turn good companies into quality companies. Rover considers that Total Quality is not a quick fix; it requires a great deal of commitment, along with the right supporting attitudes and behaviours. Rover does not wish to be too prescriptive, however, and recognises the opportunity for a self-initiated approach by individual suppliers. Progress is assessed on this basis.

Business Performance

Rover considers that, historically, its approach to measuring suppliers' business performance was subjective. A firm's financial trading position could be found in its published accounts, but this does not reveal how a company manages its budgets, measures itself against its competitors and copes with the opportunities and threats in its sector of activity. The business performance section of RG 2000 seeks to understand and assess the corporate, financial and operations management of its suppliers. It also measures the strength of the supplier's organisational structure, people resources

and technological capabilities. Business performance is, therefore, assessed in line with the following principles:

- **Corporate management:** the supplier must demonstrate that its company has a strategic mission, or long-term vision, with sound corporate objectives to achieve the stated aim. This includes a clear view of business strengths, weaknesses, opportunities and threats.

- **Financial position:** the supplier must also be able to demonstrate a financially sound business structure and trading position. The assessment mainly considers the following factors through ratio analysis: cash flow; investment; gearing; profitability; and stockholding.

- **Operational accounting:** the operation of clearly identifiable financial principles and techniques is required, with medium and long term strategic plans. These should cover areas such as: total cost management; cost planning and reduction; and demonstrate willingness to accept an open-book relationship. The supplier is required to submit detailed price breakdowns to assist joint cost reduction activities and evaluation of supplier competitiveness.

- **Design and development:** on the whole, Rover wishes to work with companies which can be justifiably be considered as the experts in the design and development of their products. The supplier is required to provide appropriate technical/technological resources at all stages of the development process. This may include 'guest' engineers invited to work at Rover Group sites.

- **Operations management:** suppliers are required to provide the infrastructure to ensure effective and efficient operations in the delivery of strategies, aims and objectives. This includes: production planning; capacity planning; information technology; management of business risk; and performance measurement.

- **Human resources:** suppliers must demonstrate an awareness of factors affecting human resources and develop the appropriate framework and skills in its people to support continuous improvement. The following areas require consideration: management style/company culture; change; development/training; skills and skills retention; employee relations, motivation, etc.; levels of responsibility/control; and communication.

Supplier Assessment and Review

Rover assesses the overall performance of suppliers in two parts:

- Assessment of business systems in accordance with RG 2000, Part 2: quality systems accreditation; project management; total quality; and business performance.

- Measurement of product/service performance: rated and continuously reviewed using appropriate measures of delivery and quality.

Rover does not specifically request its suppliers to carry out the same programme of assessment on their own suppliers, but it does provide advice on how the system can be adapted and cascaded through the supply chain.

A shortened version of RG2000 is used by Rover for the appraisal of some potential suppliers. This programme lasts for one day, and its main weakness is considered to be that its short duration allows suppliers to be able to create a good impression. Despite this criticism, Rover believes it to be a worthwhile system, providing an objective assessment of important criteria, which is itself being continually refined.

Notes

[1] Drucker, P. (1982) *The Changing World of the Executive*, London: Heinemann.
[2] Hines, P. *et al.* (1996) 'A Cost Benefit Model for Decision Making in Supplier Development Activities', In Cox, A. (ed.) *Innovations in Procurement Management*, Boston: Earlsgate.
[3] Ibid.
[4] FIDIC (1982) *Tendering Procedure: Procedure for Obtaining and Evaluating Tenders for Civil Engineering Contracts.*
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[6] Dand, R. and Farmer, D. (1970) *Purchasing in the Construction Industry*, London: Gower Press.
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[10] Ibid.
[11] Christopher, M. (1992) 'Strategies for Reducing Costs and Improving Services', *Logistics and Supply Chain Management*, London: Pitman.
[12] Hines, P. *et al.* (1996) *op. cit.*
[13] Ibid.
[14] This section borrows heavily from: Rover Group (1994) *Supplier Business Specification RG 2000 Part 2, Facilities and General Services, Issue 2 (3/94).*

Chapter 12: Standardisation and Modularisation

'Value is currently lost because the scenario is dominated by designers without due reference to implementation.'[1]

(Gray, 1996)

Introduction

The construction industry has often been criticised for its bespoke approach to design and construction, and the resultant lack of standardisation. This factor is held by many as the reason for low productivity and poor quality on projects. The construction site is effectively an ad-hoc factory, created for the purpose of producing a proto-type. Should it be this way? Other industries, such as manufacturing, appear to have generated greater levels of productivity and quality control through the greater use of standard parts and components. Could construction adopt such an approach and improve buildability? If this is possible, to what extent can construction be standardised?

The Chartered Institute of Purchasing and Supply (CIPS) highlights the problem of poor productivity in UK construction, drawing comparisons with the American Industry.[2] In its report to the Latham Review, the CIPS quotes a figure of 20–30% more man-hours for comparable UK projects. A number of reasons are given for this, including:

- frequent re-designs of minor components in the UK, compared with a greater use of standard designs in the US.
- a limited number of standard components in the US, compared with a much wider range in the UK.
- wider use of factory manufactured/assembled modules in the US.

The Construction Industry Board (Working Group 11), in its review of productivity improvements, recommended the greater application of standardised components, systems and processes in construction.[3] The report drew comparisons with the level of standardisation in the motor industry, suggesting that it had managed to overcome the problem of maximising standardisation without losing the feel of individuality.

The common argument is, however, that construction is different and that there is a need for bespoke design. It is certainly true that many of the end products of the industry are necessarily different, due to a combination of specific client needs and physical/other constraints. Although we are all aware of *'what is'* in the world of construction, the point is that we should be thinking about *'what could be'*. A number of important questions should be asked:

- to what extent should processes be different?
- to what extent is customisation really necessary?
- to what degree could one create a library of standard components in construction?
- does standardisation really have to result in poor aesthetic design?

In this chapter we will explore the re-emergence of standardisation and modularisation in construction. It is fair to say that there is nothing new about these approaches; they have been tried at various times in the past, unfortunately with mixed results. The drivers for innovation appear to be growing, however, and the technology is developing to meet this challenge.

The main drivers for standardisation appear to be the result of commercial forces in clients' own sectors of activity. For instance, competitive forces putting pressure on the business case for capital

investments, or perhaps the need to facilitate a greater speed to market. These drivers both mean that certain clients for construction must be able to build more cheaply and quickly in order to remain competitive in their own markets.

It is not intended to produce a detailed step-by-step guide to how one should develop a standardised or modular approach to construction in this book; this is dealt with more appropriately elsewhere. The focus here is on the link with effective procurement. The reader is probably questioning the validity of this association: surely this subject is about technology and design innovation? On one level it is, but the key issue is this: in a fragmented market with limited capabilities, how can such innovative approaches be realised?

This is where the discipline of strategic procurement can help to deliver the necessary improvements. There is a need to identify firms with the potential skills to take the industry forward in this direction. Furthermore, clients need to understand how such contractors and suppliers should be engaged and managed. There is little chance of successful innovation if clients attempt to procure their suppliers using short-term and reactive approaches in a market where the capabilities are not sufficiently mature; it is simply not possible to get something for nothing. Innovation requires careful planning and investment.

In this chapter we explore a number of important issues surrounding the concept:

- the differences between standardisation, pre-assembly and modularisation;
- the degree to which construction can be customised;
- strategic approaches to design and construction;
- the link with effective procurement;
- appropriate application; and
- case studies of the approaches adopted by McDonald's and BAA.

A Strategic Approach to Design and Construction

The aim of standard/modular construction is to increase productivity and quality in the process, which will ultimately reduce cost and construction periods. So what different approaches are available? The new guide from CIRIA describes three strategies which may be employed: standardisation; pre-assembly; and modularisation.[4] These are defined as:

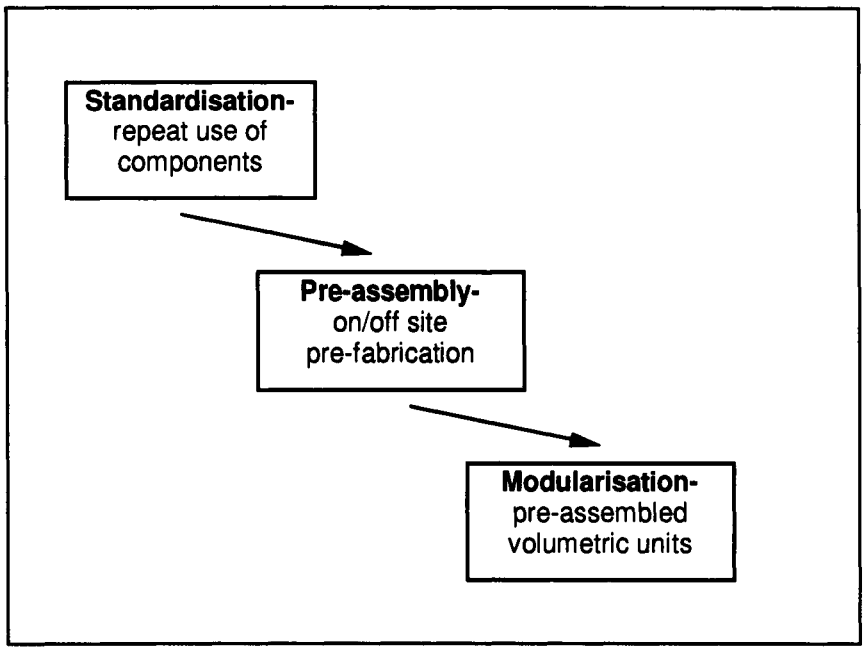
- **Standardisation** involves the extensive use of components, methods or processes in which there is regularity, repetition and a background of successful practice. More generally, it means an agreed shared framework for design decisions, such as common interfaces or a dimensional grid.

- **Pre-assembly** for a given element of work, involves the organisation and completion of a substantial proportion of its assembly before installation in its final position. This may take place on or off site, and also often involves some form of standardisation.

- **Modularisation** is a particular form of pre-assembly, in which an item is produced as a complete volumetric unit, usually fitted-out and tested before it is installed. This will typically be a complete sub-volume of the building.

These definitions tend to indicate three stages in the development of more 'buildable' construction projects. On a fairly simple level, there may be scope to increase the use of standard components across a project, or it may be possible to go further and utilise a greater number of pre-assembled items. Ultimately, it may be possible to conceive of whole 'modular' units being constructed on a factory assembly line, that are merely bolted in place on site. This hierarchy of standardisation is illustrated in Figure 12.1. The question is how far can this principle be taken with different forms of construction?

Figure 12.1: Degrees of Standardisation.



Significant benefits, as listed below, may be possible when standardisation and pre-assembly are applied concurrently:[5]

- greater cost-certainty;
- increased confidence in value for money and programme;
- better risk control and reliability;
- increased design choice and controlled innovation;
- safe working practices and minimum on-site problem solving;
- increased reliability of building performance;
- higher quality of work – aesthetics and appeal.

Clearly, greater benefits may be realised from adopting the modular approach, but this requires greater levels of investment and the ability to use a standard unit on a repeat basis. The question is to what extent can one standardise on different forms of construction?

Standard Versus Bespoke Construction

The issue concerning the appropriateness of a standardised approach to design and construction appears to have caused much debate over the years. The argument appears to have centred mainly around the issues of:

- short-term costs;
- aesthetics; and
- general client/industry perceptions.

Priestley has argued that despite the 'price-driven' character of construction procurement, the UK industry has a heavy emphasis on bespoke, rather than standard products and solutions, which ultimately leads to higher costs.[6] This highlights the paradox facing the industry: in taking the short-term view of cutting costs today, rather than investing in tomorrow, clients will pay higher unit costs in the longer term.

In a study considering the relative proportion of standardisation and customisation on projects in the UK, Gray found four common preferences held by the clients concerned:[7]

- high 'value', rather than low cost construction;
- greater use of unique components;
- project organisation oriented towards creativity rather than control;
- close attention to detail in design.

Gray explains that these findings are entirely consistent with the cultural background of the industry, which is characterised by differentiated design and bespoke buildings, which is itself rooted in national culture. It would seem that many clients still have concerns over the 'standard' approach, preferring to play safe with tried and tested traditional materials and methods of construction.

Despite the existing paradigm, there is a need for both supply and demand sides of the industry to challenge their assumptions concerning the approach to design and construction. Priestley recommends the following:[8]

- designers – to have regard to the availability and fitness-for-purpose of components, running costs and delivery times, as well as aesthetic values of good design.
- supply side – to work for greater standardisation and improved quality.

There are a number of barriers to implementing standardisation and modularisation:[9]

- the newness of the concept to both clients and suppliers;
- the unfortunate legacy from earlier forms of standardised construction, which resulted in the technique falling into disrepute, e.g. multi-storey blocks constructed during the 1960s;
- functional specifications in building can be visually unexciting and, therefore, unpopular with clients/users;
- a perception prevails that the approach is only suitable for housing, and not for large or complex projects;
- some believe that it is not suited to projects where there is a high 'services' content (i.e. 50% or more by project value).

Greater levels of standardisation and modularisation may not be appropriate for everybody, however, but the possibilities should at least be explored. How should clients and their designers approach this decision-making process?

Appropriate Application

As with any decision in the formulation of strategies in construction, clients and their advisers need to think through the business case for adopting certain approaches. Do the quantifiable and intangible benefits outweigh the costs associated with a specific direction? Does it fit with the overall aims of the organisation? This process, although fairly simple in theory, can prove very difficult when trying something new, or where the pay-back may be in the longer term. This is mainly due to the number of unknowns and variables and lack of information to make reasonable forecasts. It is much easier dealing with what is known. Although the decision to adopt an innovative approach to deliver

more standardised construction may be difficult to quantify, the end result should ultimately lead to greater cost certainty. The major questions are this:

- How should clients proceed?
- How should they decide whether it is appropriate or not?

There does not appear to be much work in this area to help clients for construction, although the petro-chemical industry appears to be more advanced. For instance, Murtaza *et al.* have developed a 'knowledge-based' approach to decision support when considering modular construction.[10] They identify five groups of factors which impact on the decision of whether to adopt a modular approach:

1. Plant Location
- How accessible is the site?
- What is the cost of transportation of modules?

2. Environmental and Organisational
- Has the organisation/its suppliers got the required capabilities?
- Are there any local/other environmental restrictions?
- Is the client receptive to modularisation and all this entails?

3. Plant Characteristics
- Does the plant lend itself to modularisation, and are there any physical constraints?
- Is it possible to integrate a modular approach with the existing facility?
- Is there scope for repeat use of standard modules within the required layout?

4. Labour Considerations
- Will modularisation lead to a significant reduction in on-site labour costs?
- Will there be real increases in levels of productivity?
- Are the appropriate skill levels available (on or off-site)?
- What is the likelihood of industrial relations problems?

5. Project Risks

- Is there scope for schedule (programme) reduction?
- Will there be an onerous increase in planning and engineering?
- What is the extent of problems concerning future maintainability?
- Can quality be maintained?

Through synthesising the overall impact of the issues identified, applying a multicriteria decision-making approach, it is possible to identify the business case for adopting modularisation. Although this example focuses on the petro-chemical industry, the methodology could easily apply to other sectors, including construction. Some factors may be generic, while others will be specific to a given situation. The parties involved have to identify what is important to their particular situation.

When considering these and other empirical observations, it becomes apparent that there are a number of key considerations, mainly:

- the potential for repeat use of modules/standard components; and
- availability of competencies in the supply market.

Holti and Standing observe that clients with a large volume demand for a particular type of building establish a relationship with contractors and suppliers to develop a standard set of designs and components.[11] This, they contend, is especially true with certain retailers. This conclusion is entirely consistent with our own findings; companies like McDonald's appear to be leading the way in this field, with the construction of their free-standing restaurants. Others have followed this successful example, for the construction of facilities such as petrol stations, including Jet, Esso, Shell and Elf.[12] The modular technique has even been applied in the public sector, for the construction of PFI prison schemes.[13]

While the adoption of a standard/modular approach clearly offers significant benefits, a fundamental issue presents a major barrier to successful implementation – market capabilities. How can the supply side of the industry deliver such improvements

when it is effectively constrained by the overriding nature of short-termism and low margin competition? One of the main arguments presented in this book is that the behaviour of contractors and designers is effectively constrained by the nature of client procurement behaviour. If clients procure projects using reactive and price-focused strategies, then the supply market will have to respond in the same way. This environment tends to discourage innovation and long-term development.

To overcome this problem it is necessary for clients, who are the ultimate beneficiaries of standardisation in any case, to take a long-term view and work more closely with, and develop the capabilities of, suitable suppliers. Whether explicitly stated or not, the adoption of this approach within the current industry context, will mean a greater level of integration between clients, designers and suppliers. It is clear, however, that this approach will only be possible for clients with regular and high levels of spend. Other clients, who visit the market infrequently, will not be able to develop such an approach so easily. Even for those who have the opportunity, success will only come from the development of effective procurement strategies.

Effective Procurement

It is clear that standardisation, pre-assembly or modular approaches
offer technology-based processes to deliver quick and more cost-effective construction. It is clear that these approaches are essentially about the development of effective procurement strategies, as the BAA case study in Chapter 6 illustrates. The airport operator has, as one of its stated procurement strategies, the desire to increase the use of standard components on its projects, in order to reduce risks and unit costs without compromising the quality of design. BAA, has realised, as must any other client wishing to benefit from these methods, that it needs to think-through the procurement issues involved:

- how should the supply chain be configured to deliver this form of construction?

- what form of supply relationship is appropriate for each party involved?

These are key supply chain issues, that have already been covered in previous chapters, but which are still very important in developing a strategy towards standardisation. It is true to say that, although the market for standard and modular components is growing, it is doing so very slowly. The supply side of the industry in isolation does not have the resources to develop the required expertise and capabilities. This necessitates an approach in which clients agree to work with the supply market to help deliver more innovative ways of working, or there will be no innovation at all. Until such time as the use of standard components is entirely commonplace, clients will have to develop close, collaborative supply relationships with appropriate firms. Enlightened clients, such as McDonald's and BAA have recognised this basic fact of life.

Case Study: McDonald's Modular Restaurants

In 1986 it took an average of 27 weeks to construct a free-standing restaurant. A year later, the company had reduced the construction period to an average of 23 weeks. Since then McDonald's has made significant improvements in productivity, and the current record is a staggering nine days, from *'cutting turf to selling burgers'*.

The repetitive 'manufacturing' ethos that McDonald's has developed provides the scope for this level of continuous improvement. It allows them to experiment with different materials and methods to increase productivity and reduce cost.

A number of years ago, McDonald's recognised that the construction of its new restaurant facilities was a repeat process, which could benefit from a higher degree of design standardisation. The company produced a set of 'master designs' for its buildings, which were constructed using largely traditional processes and materials.

The realisation of this ambition, however, proved difficult in practice. Despite the use of standard designs, it became apparent that there was no such thing as a 'standard' building. From the

prescribed mould evolved a series of buildings, which only vaguely resembled the intended design. The problem was that each regional office tended to introduce modifications to suit its own custom and practice, resulting in unnecessary cost and time being added to the construction process.

The need for an accelerated capital investment programme, coupled with the realisation that the existing design paradigm had to be broken, led McDonald's to innovate and to create a modular approach to restaurant construction. The vision was to create a system whereby the company could literally 'plug' its buildings together. This innovative approach had many sceptics at first, especially in the supply market, including many of the larger contractors.

Although maximum standardisation was the ultimate goal in the pursuit of greater productivity, McDonald's recognised that there were a number of limiting factors. These mainly involved aesthetic appearance and physical dimensions. A certain degree of flexibility had to be incorporated into the design of the modules, in order to appease the various planning requirements imposed by different local authorities. The opposing goals of standardisation and flexibility of external appearance were achieved in a number of ways:

- standard roof structure, with roof tiles in a variety of styles/ colours; and
- an external brick appearance provided by 'brick slips' of varying styles/colours.

The physical dimensions of modules are restricted in a number of ways. The optimum size of the steel box is determined by the following constraints:

- the maximum transportable size;
- the maturity of the technology means that it is uneconomic to construct modules beyond a certain size, as the amount of steel support required would result in excessive manufacturing costs; and
- the layout/arrangement of the finished building – the module dimensions must 'fit' the restaurant design.

The essential features of the restaurant buildings may be summarised as:

- steel framed modules, which are either bolted or welded together;
- composite walls consisting of 'brick-slips' bonded onto lightweight backing boards, which are fixed onto steel frames to give the final appearance of a solid brick wall.

The building arrives on site approximately ninety per-cent complete, containing all fixed equipment such as seating, decor and kitchens. The main operations on site involve bolting the modular units together and finishing the joints. Mansard roof sections also come complete and are dropped into position and bolted on.

The modular units are constructed in factory conditions by two suppliers – Britspace and Yorkon. Not all the assembly work is carried out by these two firms, however, as McDonald's employs some sub-contractors directly for certain aspects of the 'factory' work, including: all electrical work; plumbing; and fitting-out of kitchens. Erection of the modules may be carried out by Yorkon, Britspace, or one of the firm's approved regional contractors, depending on availability.

The rationale for maximising the amount of pre-assembly is that activities such as fitting-out on site are considered to be too difficult and disruptive. The services are, therefore, designed to be installed within the modular units under factory conditions, by suitably qualified direct labour. This ensures that site activities are as simple as possible and may be carried out by non-skilled personnel. For instance, all electrical services are simply and quickly 'plugged' into a single pre-prepared service point on site. Snagging on completion is also greatly reduced.

Standardisation has also been applied on a micro-level. The most obvious example is the supply and fitting of electrical components, which arrive at the factory in dedicated packs, with all connecting components and wiring appropriately labelled. The standard components are quick and easy to fit into the restaurant modules. The idea is based on the strategy of moving away from employing 'high cost' specialists, by reducing complexity, to

employing cheaper multi-skilled teams that are able to carry out all tasks.

The benefits gained through the combination of modular construction and effective supply chain management have been discussed in Chapter 5. It is important to note, however, that one of the key enabling factors for this development was the company's strategic focus and its financial support for a major R&D programme. Unless McDonald's had taken the longer-term view, the modular approach might not have been developed effectively. In reality, McDonald's is pro-actively controlling and co-ordinating its construction supply chain, to bring together the best and most cost-effective elements that will deliver its business needs on time, to cost and to the desired level of quality.

Case Study 2: BAA/Project Genesis

To many commentators, BAA's 'Project Genesis' was just the creation of another car park. To others it has been a flagship project, setting the standards for future performance in construction.[14] When one looks more closely at the approaches used in design and construction, however, it is clear that Genesis was much more than this: the fact that it was a car park is irrelevant. Project Genesis was in fact a bold experiment, incorporating many innovative techniques and practices, including:

- supply chain management;
- performance measurement;
- 3D computer simulation; and
- standardised/modular construction.

Many of these concepts had not been integrated within one project before. Introducing so many new techniques at once was, with hindsight, a fairly risky strategy for BAA to adopt in the delivery of a mainstream project. Clearly, this move created the potential for confusion and for problems to occur.

The original mission was *'to deliver BAA's most successful project'*, and this was translated into a number of objectives:

- full customer and safety focus;
- beat target costs and schedule;

- involve the complete supply chain through effective teamwork; and,
- achieve total integration throughout the design, manufacture and production processes.

A number of important questions spring to mind, when considering these aims. How were these goals achieved? How successful was Genesis? Where problems occurred, were all of the lessons learned fed-back into BAA? We will focus here on the important issues arising from the approach to standardisation and modularisation.

One of the primary features of Genesis was the development of a component-based approach to design and construction, along the lines of a 'Lego set'. The aim was to maximise the use of standard and modular components, as far as possible, in order to improve productivity in the construction process.

During the design stages it was realised that the actual utilisation of modules would be fairly limited. This form of construction was only really considered viable where it would be possible to obtain repeat use. Notwithstanding this, the modular approach was applied in two main areas: a modular lift shaft was designed by Schindler Lifts; and a modular bank was constructed and used temporarily off-site, and then re-instated in the car park at the appropriate time.

The 'team' discovered there was a greater degree of scope for standardising various components of the car park structure. Various indices were created to measure the degree of standardisation being achieved.

Production Indices

- Pre-assembly index = $\frac{\text{cost of components}}{\text{cost of components + materials}}$

  (1= good, 0 = bad)

- Standardisation index = $\frac{\text{total no. part numbers} - \text{new part numbers}}{\text{total no. part numbers}}$

  (1= good, 0 = bad)

- Repetition index = $\frac{\text{no. components}}{\text{no. part numbers}}$

  (big = good, small = bad)

- Value index = $\frac{\text{cost of system}}{\text{no. components}}$

  (big = good, small = bad)

The core team consisted of:

- Ove Arup – design manager;
- Mace – production manager;
- EC Harris – cost manager;
- BAA – project manager;
- Intergraph – data/model manager;
- HGP – lead designer;
- WS Atkins – planning supervisor.

Key suppliers included:

- Bison structures – superstructure;
- O'Rourke Civil Engineering – substructure/foundations;
- Elliott Group – modular bank;
- Crown House Engineering – M&E installations;
- Schindler Lifts – lifts

Drawing on comparisons with the approach used in aircraft design, where one party designs the wings, etc. the building was divided into three key components:

- substructure (and infrastructure);
- car park; and,
- retail.

Each of the components was assigned a dedicated 'delivery' team, tasked with the production of their respective sections within time and cost targets. It was also hoped that significant savings would be made whenever possible by this more open, collaborative and standardised approach.

Like most experiments, things did not always go smoothly. The final out-turn cost exceeded the original budget and the project was delivered seven weeks late. This is perhaps not too surprising in the circumstances. The fundamental question is, should Genesis have been managed as an R&D project, with an appropriate business case and budget, based on the costs and benefits of the innovations, rather than the short-term horizon of a mainstream project?

Some of the key learning points Mace (the production manager) drew from the adoption of this approach to standardisation include the following:[15]

- there is a lack of design information in a standard 'off the shelf' format – need to develop further the standard 'library' of components for other projects;
- design needs to be fully managed and co-ordinated;
- when suppliers are responsible for aspects of design there is a need to ensure that they are competent and fully integrated;
- the appropriateness of components for standardisation/ modularisation need to be identified; and
- it is necessary to ensure that all designers provide compatible information in the right format for the 3-D model.

As a result, although there were significant problems operationally the approach was seen as providing important lessons as part of a longer term project. If the key lessons are learnt from the Genesis

project it is clear that significant improvements might be possible whenever the standardisation methodology is used again. Indeed, participants believe that, if the lessons learnt are taken up in subsequent projects that the potential for a car park construction unit will have been achieved. The key learning point here is, of course, that such continuous improvement can only occur if there is regularity of commitment by both the buyer and supplier. The learning form Project Genesis will be lost if this continuity is not maintained.

Notes

[1] Gray, C. (1996) *Value for Money: Helping the UK Afford the Buildings it Likes*, Reading: Reading Construction Forum and the Reading Production Engineering Group.

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Chapter 13: Strategic Cost Management

Introduction

Sir Michael Latham[1] presented a major challenge to the industry when he concluded that there was substantial scope for eliminating unnecessary costs from the construction process, and that a target of 30% reduction in real costs was realistic and achievable within five years. Working Group 11 was subsequently established and instructed to pursue this recommendation. The output from this exercise identified a number of parameters which affect cost, and made a number of recommendations that could be implemented to achieve lower costs in construction.[2] These included: the production of a variety of client guides; the encouragement of 'true' partnering; the use of 'shared' information technology; the promotion of risk management; improved tendering procedures; a greater emphasis on life-cycle costs; standardisation of components, systems and processes; and the creation of a culture of teamwork and trust.

While these actions may or may not lead to the elimination of unnecessary cost, the client is still faced with a major issue: how should the process be measured to ensure that lower costs are actually being achieved?

The process of cost management may be considered from either the client's or the contractor's point of view. The approach traditionally adopted in the industry is more one of cost control

than cost management. Such systems allow the manager to observe current cost levels, to compare these with a standard plan/norm, and to initiate corrective action to keep cost within acceptable limits.[3] The emphasis here is on 'containment'. This is especially true in the public sector, where achieving a final account within an acceptable tolerance of the original budget is often the main management imperative. This gives the impression of accountability and value for money, but does it really deliver significant cost improvement? By analysing the traditional approach to cost management, and considering its inherent limitations, it becomes possible to identify an alternative approach – referred to here as strategic cost management that can help clients achieve significant improvements in final outturn cost.

Traditional Cost Management

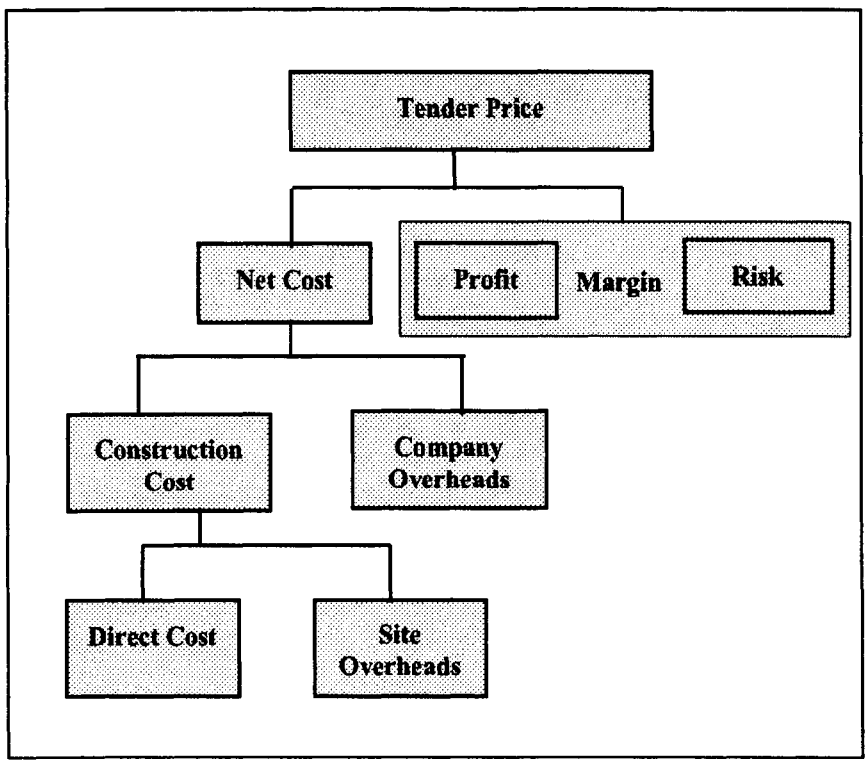
There are a number of writers who provide comprehensive descriptions of the traditional approach. Pilcher[4] describes the system of cost control associated with traditional construction procurement. This is where the client appoints a consultant to undertake all professional services on his behalf, including: design work; preparation of contract documentation; invitation and adjudication of tenders; construction administration; and, cost control. An initial estimate of costs is produced by the consultant, based on similar previous rates (which may be adjusted for inflation, etc.) and/or standard rates from a price database (such as the RICS' 'Building Cost Information Service').

On receipt of a tender, a contractor will make an initial decision on whether to proceed with bid preparation. This will depend on factors such as current work-load and the level of risk associated with the project. Does the job fit in with the requirements of the business plan? Does the company have the necessary experience, specialised equipment and technical expertise? How desperate is the firm for work? What are the sales targets? Is there a need to receive a contribution towards company overheads? Is there a greater than normal risk of high expense being incurred? If so, will it mean an increase in costs presented in the bid, or can such events be economically insured against? The answers to all of these questions will dictate whether the contractor will proceed or

not, and the most appropriate pricing policy to be adopted if a tender is submitted.

In deriving a detailed tender price for an item of work, the contractor will calculate all costs for the elements shown in Figure 13.1

Figure 13.1: Elements Contributing to Contractors Tender Price.[5]



As the figure shows the company, first, establishes the cost of construction in relation to direct costs (materials, labour, plant and sub-contractors) and indirect costs associated with site overheads (management and supervision, offices, canteen, storage sheds, transport, temporary access/services, etc.). This then forms the basis for calculating the net cost of the work item, with the addition of a suitable contribution towards the company's fixed

costs, i.e. the general company (head office) overheads. This figure includes the provision of company management and administration, design services for any temporary/permanent works, computer processing, cost and budgetary control, personnel services, training, and so on. Head office overheads are usually apportioned to a tender as a percentage of total projected turnover.

Having established the net cost of the work, the contractor must then produce the final tender sum to be presented to the client. This process involves determining a suitable margin to be added to the net cost, reviewing all costs for accuracy, the influence of inflation on prices, and any costs associated with financing the works. The margin includes a suitable allowance for profit and risk. Profit is the sum of money retained by the contractor after the project is completed and once all costs associated with the execution of the works have been paid.

There is a very important influence on the final level of profit retained, and that is the management of risk. Risk and cost are inextricably linked; failure by the contractor to successfully manage the risks apportioned to him will result in an increase in costs and, therefore, reduced profit. Consequently, the contractor must establish suitable plans for the management of risks under his responsibility, or provide suitable contingency allowances to cover their potential impact. Having undertaken these steps the contractor is then in a position to submit his final tender figure, in competition with others.

The client then reviews all compliant bids and makes an award to the most economically advantageous tender. The process of cost control then shifts back towards the client. Potts[6] explains what the four main aims of the clients' cost system normally are:

- to enable the client to monitor changes to the tender budget prior to sanctioning additional work;

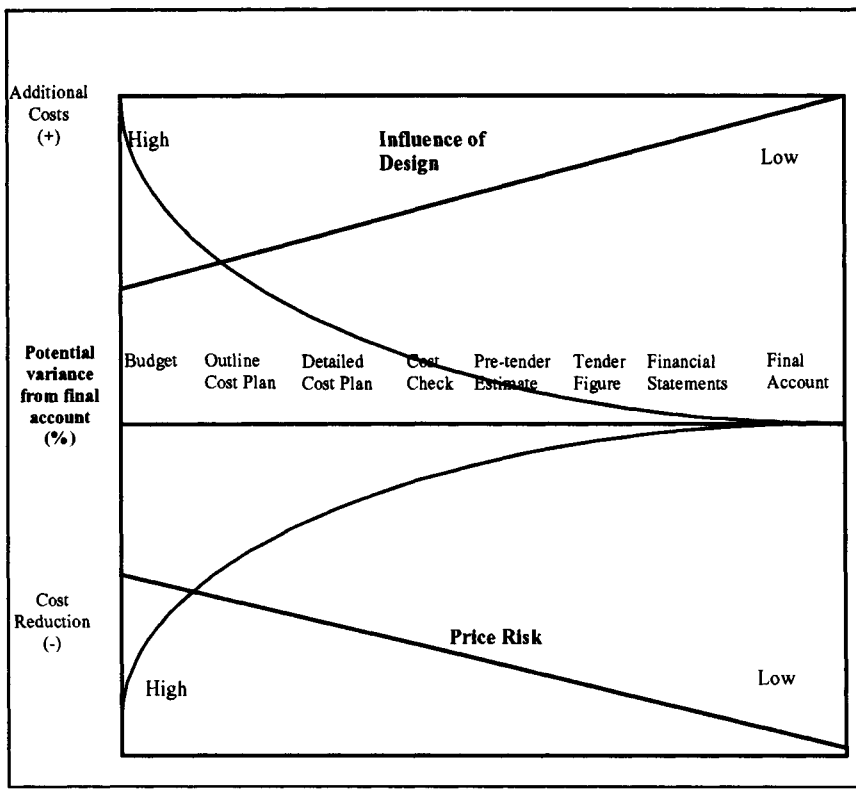
- to facilitate effective management of budgets and anticipated expenditure;

- to enable the cost impact of major changes to be considered within the context of the whole project; and,

- to provide sufficient scope for client to foresee and avoid any unnecessary cost.

Potts also provides detailed information on suitable formats for both client and contractor. These appear to be worthwhile models for the essential monitoring function, but it is clear that the emphasis throughout is on the measurement and containment, rather than on the pro-active management of costs.

Figure 13.2: Stages of Cost Management.[7]



Limitations

The traditional method focuses on compliance with budget estimates, rather than the pro-active management of value, in the delivery of a client's construction needs. There are, therefore, a

number of limitations associated with this traditional approach to cost management by clients in construction. These are essentially concerned with focus, pricing structure, transparency and incentives.

Ignorance of pricing structures

The price paid for any good or service is normally a function of the interaction of various factors, including: expected demand; intensity of competition; expected development cost (of product); volume of work from client; importance of the customer to the supplier; and the perceived value of the product to the customer.[8] Price may be affected in two ways: through direct changes in the cost structure; or through indirect changes, due to changes in market structure and shifts in the nature of supply and demand relationships. For example, the 'boom–bust' cycle endemic to the UK construction market means that 'cut-throat' pricing predominates in times of over-supply, and premium pricing prevails when demand out-strips supply.

The assumption behind many client approaches to cost management, however, is that 'competitive pricing' provides the most appropriate mechanism to deliver best value for money in all circumstances. All things being equal, it is believed that the market will deliver the most efficient cost for any item of work. The trouble is that all things are not 'equal', and there are many intervening factors which invalidate the notion of a perfect market, including: structural conditions; lack of information and greed.

The result is that clients for construction are effectively 'price-takers'; they merely receive the price from the supply market, without challenge, and hope that the final out-turn cost matches the accepted bid price. In adopting such a position clients are allowing themselves to be conditioned regarding their perceptions of 'value'. The point is that clients are not sufficiently aware of the 'true' costs of construction, they merely accept the information given to them by the supply market, and perceive that value for money is being achieved.

This perception is effectively reinforced by the clients own estimating process; the client assumes that historical prices provide a valid basis for estimating outturn costs of similar future works. It is convenient to accept these prices as 'gospel' and assume a

superficial understanding of how they were derived and may be applied in the future. At the time of tender, the supply market will hopefully match the estimate, or even under-cut it. On the other hand, the estimate may be exceeded. At this level the client doesn't really understand the prevailing pricing structure, although experienced clients may intuitively know whether pricing is 'keen' or not.

There are in fact not one but three basic pricing structures that clients can use: cost-related; market-related; and competitor-related.[9] As the names for each of these types suggests, each methodology has a different focus, depending on the specific drivers concerned. Cost-related methodologies emphasise the calculation of total production costs and the deriving of suitable levels of profit for cost recovery. Market pricing methodologies are focused on the conditions that allow the maximum price to be extracted from customers. Competitor based methodologies focus on the magnitude of rivalry between competitors as the major determinant of pricing strategy. These may be further sub-divided into a whole series of sub-category pricing strategies which may be adopted by suppliers, as summarised in Table 13.1. Clearly, any contractor will wish to adopt an approach to pricing that will allow a contract to be won, while extracting the maximum profit possible. The major issue facing the client is understanding which pricing structure it is receiving and what the appropriate management response should be. Each of the approaches described in Table 13.1 can offer a way forward for the customer.

A Strategic Approach to Managing Costs

Some clients for construction are, however, now asking the fundamental question: 'what *should* construction cost us?'. As explained, earlier, the traditional approach to cost management has ensured that a veil is held over contractors' costs and pricing structures. In taking the pro-active 'should-cost approach' specialists within some client organisations are beginning to estimate the supplier's cost price of a particular component and are trying to negotiate a more favourable price.[10] This technique, which is referred to here as Strategic Cost Management, has been widely used in many other industrial sectors for some time.

Table 13.1: Pricing Structures [11]

Pricing System	Derivative	Description	Application
COST-RELATED	Standard-cost pricing.	Covers standard variable cost and fixed cost per unit, plus profit, adjusted on basis of competitor pricing.	
	Cost-plus-profit.	Standard mark-up applied to total cost of each product.	
	Break-even analysis (target profit pricing).	Determines the price that will yield the required profit.	
	Marginal pricing.	Refers to the marginal cost of manufacturing each unit.	
MARKET-RELATED	Perceived value pricing.	Pricing based on assumptions of customer beliefs of 'value'.	
	Psychological pricing.	Price used as a tool to condition customer beliefs, e.g. quality or value.	
	Promotional pricing.	Discounts offered to generate high turnover.	
	Skimming.	High price to 'skim the cream' off the market.	New/unique product.
COMPETITOR-RELATED	Competitive pricing.	Tackling the price leader in a particular segment.	
	Discount pricing.	Set artificially high prices and offer discounts to attract customers.	
	Penetration pricing.	Significantly under-cutting competitors prices to generate turnover.	

Definition

Strategic Cost Management involves benchmarking supply market information on input costs, overheads and profit levels, and the development of cost models against which competitive prices can

be analysed.[12] This leads to more visible cost and price information. Analysing cost information in this way aids identification of areas and targets for cost reduction, without necessarily affecting profit margins. Profitability will, of course, always depend on the circumstances surrounding the prevailing pricing structure in the market.

The concept of 'open-book' costing and negotiation is common place in many industries, albeit with many variations on a central theme.[13] The fundamental rationale behind this is that a supplier must explain his cost structures to the customer, and in return the customer must help the supplier to obtain cost savings. It should be appreciated, however, that this is not just an altruistic approach to improve the performance of suppliers. There should be no illusions; the client is trying to engineer long-term reductions in cost through improved supplier performance, and is attempting to use the information gleaned from any frank discussions as a lever in price negotiations. This is a very tough discipline indeed.

The process behind 'open-book' negotiations is often considered to be a one-way flow of information. 'Transparent costing' is different, it provides a two-way exchange, to enable both organisations to concentrate on the optimisation of the supply chain.[14]

Table 13.2: Strategic and Traditional Cost Management Compared.

Attribute	Strategic Cost Management	Traditional Cost Management
Cost visibility.	Open-book/transparent.	No visibility for client.
Pricing structure analysis.	Considers contractors use of different approaches.	Assumes 'competitive' pricing for all situations.
Management approach.	Pro-active cost reduction.	Reactive cost containment.
Incentives.	Considers appropriate use of incentives.	No real consideration of incentives.

Process

Porter identifies six steps that may be used by customers in strategic cost analysis:[15]

- Identify the appropriate value chain and assign costs and assets to it.
- Diagnose the cost drivers of each value activity and how they interact.
- Identify competitor value chains, and determine the relative cost of competitors and the sources of cost differences.
- Develop a strategy to lower relative cost position through controlling cost drivers or reconfiguring the value chain and/or downstream value.
- Ensure that cost reduction efforts do not erode differentiation, or make a conscious choice to do so.
- Test the cost reduction strategy for sustainability.

Risks and Benefits

Applied in the private sector this way of managing costs has led to cost reductions of 15-30%.[16] This is because suppliers are often not aware of the cost inefficiencies that exist within their organisations, and their supply chains. By providing objective data in this way, opinion is replaced by fact. This allows managers to understand the real cost drivers in the supply chain and, by analysing these, assists in the elimination of non-value-added costs/activities.[17]

The paradox is, however that, although sharing information can potentially lead to improved supplier performance and competitive advantage, there is a major risk involved. By exposing sensitive information and revealing strategic plans, a company's supply chain position can be exploited by either party, causing a loss of competitive advantage and/or independence. In the case of open book costing, abuse of the relationship is more likely to occur on the client side. As a result, for the supplier, the perceived risk is often believed to outweigh the perceived advantages, and thus potentially realisable benefits are foregone. This means that

understanding the power in the relationship between the buyer and the supplier, as well as the motivations of both parties, will be two of the major success factors in the use of this methodology.

Key Success Factors

The successful application of this technique, therefore, does tend to rely on the quality of the relationship between the buyer and seller. It also requires a fundamental understanding of how suppliers manage their cost accounting, the structure of supply markets and the distribution of power within these. Clearly, for success to occur there must be mutual dependency – a shared coincidence of interest – beyond the limits of the immediate transaction.

Research by the Construction Industry Institute in the USA has found that, where a high degree of trust exists between parties in the construction process, cost benefits are more likely to result.[18] This work found that unnecessary costs can be avoided in the following areas: team efficiency; timing of decisions; project schedule; quality performance; re-work; administration; and supervision. The analysis considered data from 262 projects in the United States, and established that cost reduction can be achieved in: alternative methods of construction; value engineering; constructability; contract administration; risk allocation; dispute resolution and communication.

In each of these areas high levels of trust were found to underpin successful performance. This raises the interesting point that 'trust' must be one of the key determinants of success. While the authors accept that 'trust' on both sides can be a necessary condition of successful strategic cost management, the basis on which 'trust' occurs may only rarely be due to a mutual equivalence of power. There are clearly types of 'trust' in relationships. In the authors' view, however, it is better to seek control and the minimisation of dependency in relationships than it is to search for relationship mutuality.[19]

Barriers

Apart from the fear that cost transparency might damage the interests of an organisation, there are a number of other barriers which must be overcome before success can be achieved.[20]
These are listed below:

- **Organisational culture** is a strong factor. Both sides of the relationship need to move away from non-trusting, adversarial behaviour. If this does not occur then transparency will be reduced.

- **Managerial instability** concerns the mobility of individuals to move from company to company in the west. Potentially this practice can lead to the dissemination of confidential information, and may limit the scope for effective cost transparency.

- **Practical inhibitors** operationally can reduce effectiveness. A major problem is often the difficulty of obtaining the required information. Even when it is collected it can often be difficult to dis-aggregate the data because profits from one area are often used to cross subsidise losses elsewhere. A second problem is the difficulty of constructing supply chain structures capable of using cost information for process improvement. The main problem here is intra-organisational rather than inter-organisational relationships. There is a need for cross-functional relationships within organisations, otherwise political in-fighting can subvert the inter-organisational benefits generated by this approach.

It is clear, therefore, that a strategic approach to cost management rather than containment is possible, but only in certain circumstances. An analysis of the strategic cost management process developed for the procurement of construction works by Rover Group provides a useful insight into how, and when, it is possible to use this methodology successfully.

Rover Group's 'Effective Cost Management'

The Need for Change

Historically, Rover's approach to cost management in its construction projects mirrored the traditional approach described earlier. Scheme budgets were set, based on initial estimates, and then refined during the various stages of procurement, as cost information became more certain and accurate. On completion of the design, tender documents and drawings were issued to competing contractors, who would then submit their priced bids for assessment.

The reliance on historical rates for budget setting and 'competitive' pricing to determine construction costs, however, often resulted in the budget figure being exceeded. In cases where the tender figure exceeded the budget by too great a margin, the scheme would be shelved or re-tendered on a lower specification. This approach, although designed to ensure value for money and accountability, meant that a great deal of uncertainty surrounded projects. It was not always known whether they would receive the go-ahead or not, and if so, whether certain sections would be cut in order to reduce excess costs. Problems associated with cost certainty in other areas were also experienced frequently during the construction phase.

It became clear that Rover required a more effective and flexible approach to cost management, one that would facilitate greater cost certainty, allow for control of suppliers' costs and provide the scope for cost reduction. The company no longer wished to be reliant on supply market pricing policies, and wanted to challenge and scrutinise costs in detail in order to establish the 'true costs' of construction.

It was recognised that the only way forward was to introduce 'open-book' costing, although it had to be done in an appropriate manner. Rover realised that it would need to create the right conditions for this approach to work, and that one of the key success factors would be the nature of the supplier/client relationship. Without continuous close working, the required level of trust between the parties would not develop, and the 'open approach' would eventually fail. This strategic approach to cost

management is, therefore, closely inter-linked with Rover's approach to supply chain management, described earlier.

Effective Cost Management (ECM)

Strategic cost management was introduced into Rover's construction procurement process in 1993, following successful implementation in production purchasing a few years earlier. Known as 'Effective Cost Management' (ECM), the system was adapted from an approach originally developed by Honda. It was transferred to Rover, during the period of their alliance, as a technique for reducing the cost of finished vehicles, through careful management of the costs of each component. ECM is now applied across all activities involving the procurement of external goods and services.

Using ECM Rover is able to establish acceptable rates for construction items, overheads and profit, check on the costs of sub-contractors, and ensure that the firms involved apply the right management styles and techniques to drive costs down. There are three main objectives to be achieved:

- **Confidence:** Rover needs confidence in its cost estimates to be able to make a sound business decision on project viability. The project team must, therefore, understand all cost elements involved in a new project with a measurable level of confidence at the approval stage.

- **Commitment:** Rover wishes to instil a commitment to achieve or under-cut the budget target set out in the business case.

- **Certainty:** Certainty of cost and cash-flow are essential to the successful management of any business; any uncertainty may reduce investors' confidence. Rover has, therefore, adopted a philosophy of 'designing to a cost', rather than the traditional engineering-led approach of 'costing a design.'

Principles

In order to achieve its stated objectives, Rover has established four main principles on which the process of ECM is based: ownership by the originator; teamwork to facilitate improvement; up-front cost development; and, commitment to targets.

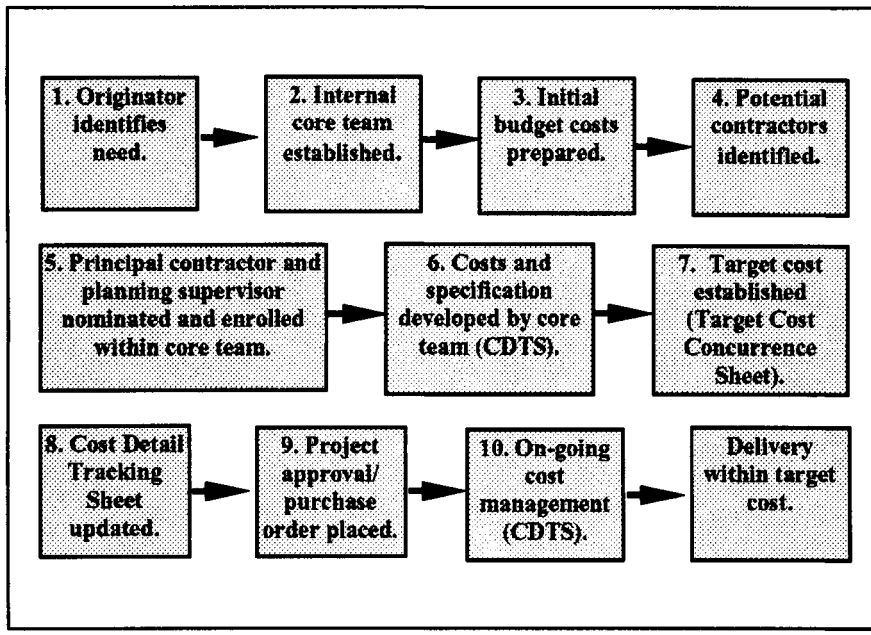
- **Ownership:** Rover considers that the cost of any item, whether a small component, a major facility, or a service contract, is substantially dictated by its specification and design. In fact, it has been suggested that these factors can influence approximately 80% of an item's final cost. Establishing clear ownership of a target cost to the originator of the specification has two effects: firstly, it places the responsibility for the management of that cost with the party most able to influence the final outcome; and secondly, it instils a personal commitment to achieve the target, or under-cut it.

- **Teamwork:** While the originator has the responsibility to manage the cost (ownership), he is only a part of the team which plans the full project requirements and establishes the business case. Rover believes that the team is stronger and more flexible than the individual, and to ensure project success all team members should be pro-active in seeking participation.

- **Early Cost Development:** In order to establish robust up-front cost estimates, the company believes it should involve its key suppliers (contractors) and draw on their knowledge and experience. This allows any potential problems to be resolved at the earliest stage possible, as well as the establishment of 'value-managed/engineered' cost savings.

- **Target commitment:** Once cost targets have been established, the core team members (including contractors and suppliers) are required to commit to delivering the item specified, to the required programme and at the agreed target cost. The project can then go forward for financial approval, when the decision is made on viability, following consideration of project costs against the specific business case.

Figure 13.3: Rover's ECM Process.



The ECM Process [21]

Having established the objectives and principles behind ECM, it is now possible to explore the detail of the process and how it works in practice. Rover has developed ten essential steps, which lead to the delivery of the facility at (or below) the target cost. Figure 13.3 illustrates the steps involved.

The Core Team

In the process of investigating a specific business need or functional requirement, Rover brings the key players together at the earliest possible stage, to establish what is known as the 'core team'. Its members are selected on the basis of their potential for having a significant impact on the final project cost. Initially, the core team must establish its structure, flow of information, and supplier selection strategy, enrolling other functional areas as necessary. The core team is then responsible for driving the application of ECM throughout the project, fully understanding

supplier costs in the achievement/ improvement of the target cost, to ultimately effect the optimum business solution. The requirements for each project may vary, but typically the core team members would include the following parties, drawn from inside and outside the organisation.

Table 13.4: Typical Membership of the Core Team.

Internal:	External:
End User Area – facility requirements.	Cost Consultants – cost information and management.
Facility Engineers – facility requirements.	Principal Contractors – design and construction input and development of cost reduction opportunities.
Finance – financial/budgetary information.	Specialist Consultants – design input.
Purchasing – commercial aspects, supplier sourcing strategy.	
Others may include: production engineering; logistics; maintenance; manufacturing; and commercial systems.	

One of the most critical competencies enrolled at the outset of a project is provided by the cost consultant. This service is key to the success of the whole ECM process. To ensure that rates charged by the 'partnering' contractors are competitive, and to prevent a cartel situation from forming, Rover uses comparative costing techniques (benchmarking). External cost consultants (currently Yeoman and Edwards, or Walker-Cotter for small works) compare the rates put forward by the construction partners with various industry standards for materials and labour prices. Rover also checks on the industry norms for levels of overheads and profit. The cost managers are also able to benchmark costs across the construction partners. A detailed understanding is, therefore, gained as to the fixed and variable costs associated with running a construction company which gives Rover further leverage over its suppliers.

A representative from the Risk Management Department may also be introduced into the core team. Input may be required at an early stage in relation to the risks associated with proposed project

layouts, including such issues as: health and safety; fire precautions; production risks; and so on. Rover is currently in the process of developing a structured approach to risk management for construction, along the lines of the process employed in production engineering, entitled 'Failure Mode Effects & Criticality Analysis' (FMECA).

Specialist design consultants are appointed on the basis of the competencies required for a particular project. Suitable firms are selected from a pool of preferred suppliers; a full RG2000 assessment is considered unnecessary, as the total spend on such fees is relatively low. Rover has expressed a preference, however, in favour of a reduction in the use of design consultants, and for a greater involvement in the design process by its primary contractors. This, it believes, will increase the 'buildability' of design proposals and lead to greater efficiencies on site. The knock-on effect of this policy will be for the contractors involved to develop a greater in-house expertise, along the lines of true 'design and build' firms, exemplified by the Japanese construction industry.

The Steps

1. Originator identifies need: The first step, as would be expected, is the identification of the business need. Having established that a sound commercial case exists for a change in facilities to accommodate the business process (for example, to accommodate the production of a new model), the next question that needs to be addressed concerns the identification of an appropriate solution. Can the problem be solved by a minor alteration to the existing facilities, or will a major modification or new facility be required? Once the actual need has been established, the 'ownership' process begins. The party who has most influence over the final cost is assigned ownership and, from then on, has the personal obligation of delivering the project to the target cost (not yet established). This will usually be the facility or service engineer.

2. Internal core team established: The internal core team is established at an early stage and includes all parties with a 'stake'

in the project. Members may include a combination of representatives from the purchasing; finance; user area; and facility engineering departments. It is the team's duty to pro-actively manage the ECM development process.

3. Initial budget costs prepared: An external cost manager appraises the requirements of the internal core team and prepares the initial cost plan.

4. Potential contractors identified: The core team has to identify all potential suppliers. In the case of construction 'partnering' projects, contractors are selected from the standing list of appointed firms, which currently includes: SDC, Anglo-Holt and Birse. Other competence requirements must also be identified, and the potential suppliers established (for example, the need for a structural engineer).

5. Principal contractor & planning supervisor enrolled: The nominated principal contractor and the planning supervisor (required under the CDM regulations) join the core team. Selection is on the basis of their 'fitness-for-purpose', following an assessment of current resource planning, project-specific expertise and competencies required, as well as previous performance on Rover projects.

6. Costs and specification developed: The core team develops the full project specification, drawing on the suppliers' (principal and sub-contractors) expertise. Open-book costing is used to establish the cost of each element of construction work, based on the specification developed. Risks and opportunities are identified, so that risks may be managed and their impact on final cost minimised. A 'value management' approach is adopted to explore opportunities for cost reduction.

The costs derived so far are construction costs only. Suitable levels of overheads and profit required by the contractor also need to be negotiated. Rover does not wish to pay exorbitant costs but, by the same token, requires its suppliers to make a sufficient return to facilitate their continued development. An adequate investment in quality staff, techniques, processes and equipment would not be

possible if Rover did not sufficiently reimburse its suppliers. A suitable margin is agreed on the basis of what is judged as reasonable within the industry at the time, allowing for the firm's development, and the risks to be carried. Overheads and profit are established as a percentage of the estimated construction cost, and is protected for that project. Cost management is facilitated by the use of a Cost Detail Tracking Sheet (CDTS), which is discussed in more detail later.

7. Target cost established: Once the core team has established the target cost, including on-costs, all parties have to 'sign-up' to a commitment to achieve the target, and preferably achieve a lower final outturn cost.

8. Cost detail tracking sheet updated: All relevant information affecting costs is updated on the Cost Detail tracking Sheet. At this stage the scheme can go forward for project approval.

9. Project approval/order placed: Rover then has a two-stage financial approval. Firstly to approve the business case, based on the firm cost information established by the core team. Then a final 'rubber-stamping' is given to the project and the core team receives the authority to place an order. The principal contractor receives a purchase order containing Rover's standard terms and conditions. A 'partnership' agreement with a schedule of works may also be employed to formalise the company's requirements.

10. On-going cost management: Perhaps the most crucial phase in the total ECM process occurs during construction. It is at this stage, on traditional construction projects, where variations in the works occur, claims commence and budgets are exceeded. This is where ECM comes into its own, as it provides the necessary controls to ensure completion within the agreed cost and time constraints.

The core team manages this stage of ECM with the continuing aid of Cost Detail Tracking Sheets (CDTS). The CDTS contains a breakdown of all elemental costs (including work items, fees, profits and overheads) and requires the inclusion of all variations (additional costs and savings), and the identification of further cost

risks and opportunities. The CDTS is updated regularly, at each core team meeting (at least every two weeks), and all cost data can be stored on a handful of sheets: this is not a massive exercise in administration.

Risks as well as opportunities for cost reduction are continuously identified throughout this phase, using a variety of techniques, including: value engineering and 'brainstorming.' Value engineering attempts to question the level of specification and design required to efficiently meet the project objectives, without affecting the overall quality or safety aspects of the project. Brainstorming involves representatives from all levels of the construction process, to identify potential efficiency savings.

Rover guarantees to cover the costs of any trials used in the pursuit of cost savings, as well as any other 'reasonable' costs incurred. The total process of ECM should bring the project to completion, and handover to the end user, at/below the budget cost and fully satisfying Rover's requirements. So, how are variations (additional and savings) in cost dealt with?

Additional Costs

In order to manage cost pro-actively, Rover believes that there is a need to monitor where additional costs arise and to analyse the resultant trends and patterns. Variations at Rover often occur due to changes in specifications, for example – the enlargement of a facility, and occasionally due to unforeseen items, such as poor ground conditions.

With ECM, the emphasis is on the core team solving problems at the earliest stage possible, to limit the effects of changes on the final project cost. If an increase in costs appears likely, due to the increase in cost for one element, then the core team has to look for opportunities to reduce costs elsewhere, in order to compensate for this.

Savings

Any savings identified are effectively placed into a 'pot' by the core team, initially for use on the current project to off-set any increases in cost on certain elements, or to enhance the specification of any particular aspects. Any further savings could

be transferred to the budgets of other projects, or even returned to the Group for use elsewhere in the business. The decision is made at the discretion of the core team, but the contractor does not receive any direct reward for his efforts in reducing construction costs.

As we have already described, the principal contractor's figure for profit and overheads is set during negotiations at the cost development stage. This figure is protected for the project concerned, whether savings result or not. The main incentive for the contractor to reduce costs comes in the form of repeat business with Rover. A further bonus may be realised through the fact that the greater the efficiencies achieved on a project, the greater the return on resources employed, given a fixed sum for profit and overheads.

Performance Measures

The business case for construction investment has come under increasing pressure during recent years. Construction is not an 'end' in itself, and has to support the overall needs of the business. Performance, in terms of the delivery of projects to an agreed target cost, on time, and to the required level of quality is paramount. Two essential processes help Rover to achieve the required result: the RG2000 supplier quality programme; and the ECM/Supplier Partnership. The various performance measures incorporated within these processes provide the enabling mechanisms for management control in the achievement of business-led targets.

Success of ECM

Since the introduction of ECM Rover estimates that approximately 95% of its projects achieve, or come in below the target cost. Of these, roughly half achieve net cost savings, allowing Rover to increase its construction programme as necessary. It should be noted that prior to the introduction of the ECM system, about 50% of capital projects exceeded their budget. There are still a few projects which exceed the target cost (approximately 5%), and it would certainly make an interesting study to establish why this is so. It is probably fair to say, however, that the amount of discipline

now required to establish the target cost, probably results in the initial estimate being lower than a traditionally produced pre-construction estimate in any case. This means that it is an even tougher target to hit. The chief advantage of this system to any firm must be the greater cost certainty afforded.

There is a powerful set of arguments in favour of applying ECM in the context of long-term collaborative relationships, with benefits to both sides of the supply relationship. Integration of key players within ECM / Supplier Partnership framework facilitates:

Cost Detail Tracking Sheet (CDTS)

Perhaps the most essential management tool to facilitate the successful implementation of ECM is the Cost Detail Tracking Sheet (CDTS). This document provides Rover with an overview of the cost dynamics for an entire project, which helps to detail and monitor both savings and reductions, and their resultant effects.

The CDTS is held and owned by the originator, to provide a single point of responsibility for its management in the achievement of the target cost. It provides the core team with the means to control and manage the cost implications of all changes during the life of a project. The CDTS, therefore, represents a benchmark of the latest indicated cost, against the agreed cost target. Details included on this sheet are:

- Original core team target costs for each element of construction;
- Adjustments to the target costs, including explanatory notes;
- Revised target costs;
- Additional orders raised;
- Latest indicated costs; and
- Further risks and opportunities.

Table 13.5: Benefits of Effective Cost Management. [22]

Benefits to Rover Group	Benefits to Suppliers
Promotion of cost awareness.	Greater design and development input.
Early and accurate development of specification and costs and, therefore, greater confidence in business case.	Clear understanding of status, roles and responsibilities.
Optimisation of building design.	Increased overall competitiveness.
Joint commitment to meet targets (cost, quality and time).	Adoption of good practices and process improvements throughout own business.
Targeted cost reduction, with savings passed back to Rover Group.	Clear project costing assumptions.
Continuous improvement in process, through repeat work.	Increased understanding of suppliers' total costs.
Costs monitored, understood and controlled on a real-time basis (Cost Detail Tracking Sheet).	Assurance of future business through successful projects.
Reduced resource profile achieved through 'simultaneous engineering'.	
Reduced lead-in times.	
Reduced management time (no surprises).	
Reduced costs throughout supply chain.	
Establishment of detailed cost database to facilitate future management decisions	
Less wasteful conflict.	
Delivery within target cost.	

Figure 13.4: Strategic Cost Management: Rover Group's Cost Detail Tracking Sheet (CDTS)

Project:					**Status of Issue:**				**Issue:**		**Date:**		
	Cost Plan				**RGL Orders Raised**		**Latest Indicated Cost**				**Further Risks/Opportunities**		
Cost Element	Original Core Team Target Cost (Date) £	Adjust. to Core Team Target Cost £	Note Ref.	Revised Core Team Target Cost (Date) £	Order Nr.	Value £	Savings £	Extras £	Net Total (Date) £	Note Ref.	Risks £	Opps £	Note Ref.
Substructure													
Frame													
External wls/rf.													
Canopies													
Doors													
Floor finishes													
Heating Inst.													
Sprinklers													
Water Supply													
Toilets													
Electrical Inst.													

Conclusion

In conclusion it can be argued that strategic cost management tools and techniques, such as those developed by Rover, provide a significant innovation into the traditional cost containment ways of thinking in construction. It has to be said, however, that, while Working Group 11 may have recognised the need for some of the tools and techniques, it did not really provide the necessary analysis of the underlying factors which are a pre-requisite for the successful implementation of this methodology. Our analysis of the Rover case demonstrates that clients can achieve benefit with these methodologies but only if they have already created the coincidence of interest amongst supply chain partners to allow the methodology to be implemented successfully.

Notes

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Chapter 14: Performance Measurement

'The first step is to measure whatever can be easily measured. This is OK as far as it goes. The second step is to disregard that which can't be easily measured or to give it an arbitrary quantitative value. This is artificial and misleading. The third step is to presume that which can't be measured easily really isn't important. This is blindness. The fourth step is to say that what can't be easily measured really doesn't exist. This is suicide.'

Source: Handy (1994), quoting the Macnamara Fallacy.[1]

Introduction

Performance measurement is a tool used in strategic control, that is the final stage in the strategic planning process, which should indicate what to do next.[2] It provides the organisation with a management process which is both backward and forward looking. This is because it allows a view to be formed on what has happened in the past which, when measured against specific goals, gives an indication of the action required to ensure their achievement in the future.

While this approach is commonplace in many industrial sectors, such as manufacturing, performance measurement appears to have received little attention in the management of the construction

process. Here, the emphasis has traditionally been on the measurement of compliance with the specification. While there is no doubt that the physical performance of the finished works is extremely important, organisations should also not overlook the issue of productivity and efficiency performance measures in the effective management of their supply chains. The historical lack of appreciation of this aspect of management in construction appears to have been influenced by a number of assumptions: that the competitive bidding process will always deliver the most efficient way of working; that the methods of construction are entirely the domain of the contractor; and furthermore, that it is not up to the client to interfere in such matters.

Client involvement, on the whole, appears to have been limited to the occasional consideration of method statements, checking the physical dimensions and specification of the works, and undertaking post-completion project appraisals. Even this activity is fairly prosaic, and is often more concerned with whether or not the contractor should be considered for future projects. There is no real consideration of continuous improvement. The point is that performance measurement has, in the past, either been largely ignored or undertaken in an arms-length and hands-off manner.

There is now evidence emerging, however, that some clients and contractors are taking this aspect of management more seriously. This is especially the case where long-term supply relationships are emerging, such as those being developed by BAA and Rover Group. These organisations have understood the need for a more proactive involvement in the management of their construction supply chains in the successful delivery of their requirements. They are not just concerned with the performance of the specification, but how their projects are delivered, and what could be done to improve the efficiency and effectiveness of the construction process.

This subject naturally links, therefore, with other management techniques described in this book, including: supplier development; strategic cost management; and risk management. These are all interrelated processes which help to create a holistic approach in the proactive management of supply chains.

The key issues addressed in this chapter are:

- the traditional approaches of performance measurement in construction;
- the limitations of traditional approaches;
- alternative approaches;
- which measures are appropriate;
- how performance measurement integrates with the construction process; and
- the benefits of adopting this approach.

BAA's "Strive for Five" performance measurement system is described, with particular reference to its application in the management of the Pavement Framework.

Traditional Approaches

Much of the literature on the management of construction projects appears to pay little attention to the important process of *performance measurement.* It appears mainly concerned with the various activities during the pre-contract and construction phases, through to the final account, without appearing to 'close the loop' on project completion. It is perhaps symptomatic of this that traditional performance measurement in construction, so far as the client is concerned, has been fairly limited; at best it has taken the form of a post project review or audit, and in the worst cases no form of appraisal has taken place at all.

The natural tendency is for the project team to reach the end of a scheme, settle all outstanding items and financial matters, and move on to the next job. In cases where reports and checklists are completed, they are often produced in a mechanistic way, with little real thought as to what the process is seeking to achieve. The Construction Round Table aims to promote better practice in this area of project management, and has argued that the post project audit serves two main purposes:[3]

- to evaluate whether the investment/business case has been satisfactorily achieved; and
- to facilitate learning for subsequent projects.

The audit typically considers performance in key aspects of the project, including: programme; cost; contractor performance; satisfaction of project requirements; variations/changes; specification; problems; and recommendations for future projects. This process may be undertaken by an independent third party, the project manager in his close-out report, or through more informal processes.

Limitations

There appear to be a number of weaknesses associated with this approach to performance measurement. The lack of appreciation of the purpose and benefits of such an exercise has already been discussed but there are also a number of more fundamental points:

- The process is entirely retrospective: the tendency is to review performance on completion. By then, it may be too late to take any corrective action.
- Measures tend to be the same for all projects, regardless of the project aims and objectives. There is little consideration of appropriateness.
- The focus is on meeting accepted standards. This does not support an ethos of continuous improvement.

The question must be asked, therefore, as to whether or not there is a better way of measuring and managing performance? It is clear that neither customer or supplier desires a process that is overly cumbersome and bureaucratic. There is, however, evidence that more effective methodologies are available to improve this aspect of procurement management. Many of the influences in this respect appear to have come from the manufacturing sector, although organisations involved in construction are adapting their own processes based on these methodologies. For instance, the approach being developed by BAA, explored in some detail later in this chapter, shows that the company has begun to think through what it really wants to achieve, and how the measurement of its suppliers' performance will help. The key questions being addressed are:

- is the company concerned with compliance on budget, time, and quality criteria?
- or, does the client seek to improve performance and reduce cost, time, defects and waste?

The Building Research Establishment has also recently recognised that the manufacturing industry has changed its approach to performance measurement, and has posed the question '*why not construction?*'[4] The question is what approaches are available, and how should clients and other participants in the construction process adapt these for their use?

Alternative Approaches

There are two major alternative approaches to strategic performance measurement. These are the approaches developed by Kaplan and Norton[5] and by Meyer.[6] The first is known *as The Balanced Scorecard.* This process recognises the importance of providing measures for top-level management to have a quick and comprehensive review of business and financial performance, while incorporating vital and linked operational measures, such as customer satisfaction, innovation and improvements. These measures, it is believed, provide an indication of the drivers of future financial performance. The second approach appears to build on the work of Kaplan and Norton, proposing a *dashboard* means of presentation, based on cross-functional team measures of performance. Meyer believes that the chief advantages of this approach are that it provides easier monitoring and takes better account of the need to maximise the overall goal of a project, rather than the aims of individual functions. Each of these approaches is described below:

The Balanced Scorecard

This approach allows the manager to look at performance from four different standpoints:

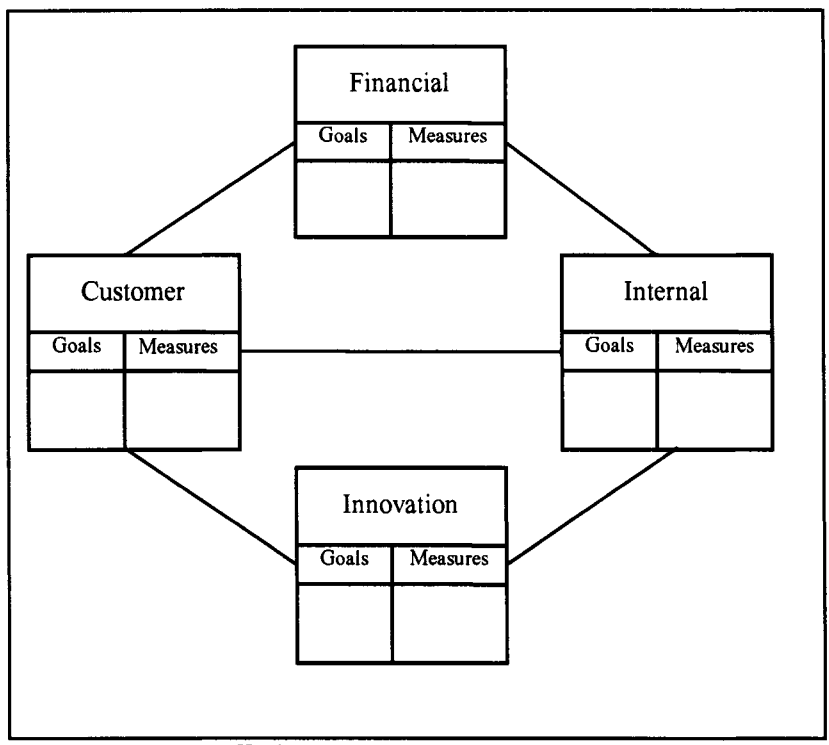
- the *customers* perspective – how customers see us;

- the *internal* perspective – what we must excel at;
- the *innovative/learning* perspective – how we can continue to improve and create value; and
- the *stakeholders* perspective – how to protect and enhance the shareholders value.

The diagram in Figure 14.1 provides an example of how this may look, and the measures involved.

It is interesting to note that Butler proposes a fifth category of measures, *the supplier perspective.* This covers the factors which are deemed appropriate in measuring the performance of how suppliers are managed.

Figure 14.1: The Balanced Scorecard



Source: Adapted from Kaplan

The Dashboard

The purpose of the dashboard is to provide cross-functional teams with a system for measuring performance in the achievement of organisational objectives. This means it is process and not functionally focused. The design should reflect the assumptions of the organisation it supports. There are four guiding principles which should be followed:

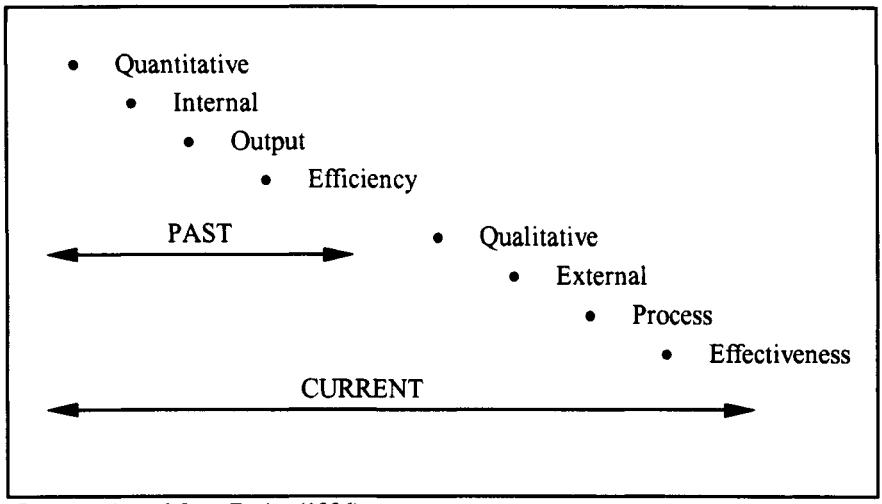
- it should help the team to gauge the process;
- it should be defined by the team, although be consistent with the aims of the organisation;
- the whole process across all participating functions should be tracked; and
- only a handful of key measures should be included.

Which Measures?

In his book *The Empty Raincoat*, Handy makes the point that what does not get counted does not count and, that as money is easily counted, money becomes the measure of all things. He points out the limitations of this approach and calls for a new, more just, scorecard which takes account of other important but often overlooked priorities.[7] While Handy appears to refer to the need for more social, as well as hard financial performance measures in business and society, the principle that hard measures alone may not be sufficient in delivering one's overall requirements is also valid in construction. The question is which measures are appropriate?

As would be expected, there is a desire amongst most managers to keep performance measurement systems as simple as possible. It is not a pre-requisite for all measures to be quantitative, it depends entirely on what is appropriate for the item concerned. Figure 14.2 illustrates the range of measures available.

Figure 14.2: Historical vs. Current Focus of Performance Measures



Source: adapted from Butler (1996)

There are a number of variables to consider in determining appropriate measures:[8]

- quantitative vs. qualitative;
- internal vs. external;
- process vs. output;
- efficiency vs. effectiveness.

Furthermore, there is a need to consider the appropriate level for application within the organisation. What is the appropriate point for measures to be made? Should they be applied to the individual, to sub-units or functions, or at the corporate level? Each organisation needs to think through what it is trying to achieve, how, where and when progress towards these goals may be measured.

Meyer tends to agree with Kaplan and Norton's belief that both financial and operational measures are important; no single form of measure can provide a clear target or focus. So, measures such as profit, market share, input cost, and so on, are essential in

appreciating the ultimate financial performance, but they do not help project teams in understanding what they should do operationally. The problem is that knowing how much a project has overspent, and how much it is overtime, does not give any indication of what went wrong. There is, therefore, a need to develop more appropriate measures to build on the standard output measures.

The Balanced Scorecard, as already described, tends to classify performance measures in terms of the different perspectives which must be satisfied in successfully completing a project. Customer measures may include: time; quality; performance; service; cost; and others considered appropriate. Internal measures stem from the business processes which have the greatest impact on customer satisfaction. There are those factors which directly affect the performance in these areas, as well as any other activities critical to success. The innovation and learning measures should recognise that the target for success is ever-changing. The organisation must always be thinking of continuous improvement, and must devise appropriate measures focusing on the ability to innovate, whether in terms of new product development or manufacturing improvement. The financial measures of course provide the 'bottom-line' focus on profitability, growth, and shareholder value, etc.

The guidance for developing suitable measures for the dashboard provides a much broader scope. It is recommended that appropriate time, cost, quality and performance factors are identified, which are critical to success in four areas: satisfying customers; mapping the process to deliver the intended results; critical activities; and track the process. The measures must be directly relevant to the project within the context of the organisation and its corporate aims.

Benefits

Butler summarises the nature of the potential benefits which should flow from the application of a more strategic approach to performance measurement:[9]

- Closing the loop in the learning process, the results of which provide direction on future actions;
- Influence behaviour, encouraging individuals to behave in the required way to achieve the organisation's objectives;
- Engender understanding, emphasis and credibility;
- Facilitate good decision making;
- Provide a focus for organisational improvement;
- Provide visible results.

These theoretical benefits make the use of performance measurement an attractive proposition to assist in the efficient management of supply chains. The question is how does this technique integrate with the construction process? Is there any evidence of improved performance through applying this approach in a construction environment?

Integration with the Construction Process

The advice so far appears to have focused on the measurement of performance in a manufacturing environment. In particular, the two alternative approaches described were developed for manufacturing companies. Is the technique equally applicable to the management of construction supply chains, or is there a need for some form of modification or customisation?

It is fair to say that there is little real evidence of effective performance measurement in construction at this stage, but as we have already indicated, there are some clients starting to develop approaches to assist in the management of their construction supply chains. One important driver in the development of performance measurement in this area is the advent of long-term supply relationships. Effectively, there has been a realisation in some quarters of a need for an appropriate mechanism to ensure performance and to guard against complacency and 'cosiness'.

In the pursuit of continuous improvement, and most importantly in the reduction of costs, contractors must have clear, agreed targets with incentives for improved performance. Only then can the industry move forward, confident that the desired

improvements and benefits are being realised. It is important to remember, however, that performance measurement should not simply be applied at the highest level. In theory, the specific performance criteria developed to manage the client-contractor interface must cascade down through the supply chain to include sub-contractors and suppliers; the performance of the primary contractor will clearly depend on the capabilities and achievement of the whole supply chain. It will be interesting to see how this issue develops as performance systems become more established.

The following case study describes how BAA successfully developed its 'Strive for Five' performance measurement system for use in many of its supply relationships. We specifically consider its application here to the management of the Pavement Framework.

'Strive-for-Five': Performance Measurement at BAA

Introduction

BAA has set itself clear targets for performance improvement in all areas of its business, including the ambitious 50% cost reduction for its construction supply chains. It is significant that the company has recognised the adage of: 'that which does not get measured, does not get done'. BAA has, therefore, developed a system of performance measures to demonstrate progress being made towards its various goals. The company's approach to performance measurement has been developed on two levels:

- Firstly, a set of performance indicators to demonstrate the overall impact of the project process in the achievement of the business strategy. These are mainly internal measures which seek to answer the important question 'do our facilities deliver what the customers want, at a price the business can afford?'

- Secondly, key measures to assess the performance of supply relationships in the achievement of project aims. These are largely external measures, the success of which will underpin

the achievement of the internal business aims. BAA has called this level of performance measurement *'Strive-for-Five'*, a name which exhorts the company's suppliers to achieve the maximum score of *five* in each of the criteria under measurement. This process forms an integral part of the company's supplier development programme, designed to achieve continuous and sustainable improvement, and the prosperity of the company and its suppliers.

'Strive-for-Five'

'Strive-for-Five' was developed as a tool to assist in the management of the company's newly emerging framework supply relationships. BAA realised that one of the most important factors to help engender a culture of continuous improvement, within its long-term relationships, would be to measure performance. This would mean setting clear targets for improved performance, and measuring progress in the achievement of these goals. There appear to be two major influences in the development of this particular approach. One is the academic work established by Kaplan and Norton's *The Balanced Scorecard*, but also on a more practical level, there is Unipart's 'Ten to Zero' quality programme. BAA considers that 'Strive-for-Five' has several major attributes:

- it is essentially non-adversarial, in order to facilitate the necessary open, 'no-blame' culture required to deliver genuine improvement;
- it engenders a spirit of 'continuous improvement';
- BAA stresses that it is *not* about vendor rating, but a dynamic system for joint development.

Key criteria for the measurement of supply relationship performance have been established. These are deemed to be the strategic drivers of performance on projects which must, therefore, be satisfied if the company is to achieve its overall goals. The core criteria include:

- cost;
- quality;
- time;

- safety; and
- environmental performance.

Other specific criteria may be included, depending on what is considered appropriate for the particular circumstances involved. For example, additional considerations may include:

- service satisfaction;
- relationship performance;
- research and development;
- training; or
- others.

Table 14.1: Key Performance Measures for Safety and Time Criteria.

Score	Safety Measures	Time Measures
0	Safety Manager and published policy	Programmes with tangible milestones
1.0	Formal risk assessment	Ability to plan and resource activities
1.5	Agreed safety management system	Joint action plans to reduce delivery times
2.0	Joint safety audits	Joint action plans to improve site logistics
2.5	Weekly 'toolbox talks'	Formal mechanisms for early warning
3.0	Joint incident investigation/reporting process	Joint analysis of non-productive time
3.5	Share daily plans with workforce	Earned value measurement
4.0	Zero accidents	Trending and forecasting techniques
4.5	Zero incidents	Just-in-time delivery
5.0	Zero near misses	World's best time

Appropriate measures are developed for each supply relationship, through a team effort involving the specific BAA framework manager and the supplier concerned. BAA naturally retains control of the process. Each criterion included comprises ten steps, numbered in increments of 0.5. These are not numerical targets, but transitory stages in the achievement of the ultimate goal. Progression from one stage to another is dependent on successful completion of the previous step. It is a pre-requisite that each step should be sustainable before the supplier is able to progress to the next stage. Examples of the steps required for two of the core criteria are given in Table 14.1

Practical Application: Striving for Five with the Pavement Team

As already described in Chapter 6, BAA has established a strategic supply framework for the production of runway pavements, with AMEC Civil Engineering as its single-source provider. One of the main drivers for this approach was the need for on-going cost reduction. It was felt that a long-term collaborative supply relationship would help to achieve this goal through:

- BAA project savings – reduced tender costs and earlier revenues from facilities through reduced lead-times;
- contractor savings – reduction of wastage (through lean resourcing), and reduced overhead costs associated with tender preparation and the resource intensive pursuit of claims.
- construction savings through improved production methods and utilisation of materials, as well as the optimum management of operational constraints;
- lower costs of mobilisation (setting up and de-commissioning, etc.);
- greater economies of scale for the procurement of contractors materials, with the potential for better discounts on long-term supplies;
- reduced supervision costs, achieved through developing a repetitious 'lean' process;

- gradual elimination of 'over-engineering' – by matching the specification to the needs of the project, and moving away from prescriptive to performance-based specifications, should allow the contractor to innovate improved methods of production; and the
- standardisation of process and material components.

Furthermore, continuous improvement would be engendered through:

- observation of problems and resolving issues in the field. All participants are encouraged to suggest improvements, and worthwhile ideas are either implemented immediately, or assessed through a value management/engineering exercise;
- specific task forces are established to address designated areas for improvement. This involves two or three individuals exploring issues and formulating recommendations for improvement to management team. Benefits must be clearly demonstrable;
- innovation and improvement through R&D. The viability of some ideas for improvement may require further investigation; and
- improved joint communication at all levels.

Clearly, BAA had identified a number of areas where it would expect improvements in the process of pavement production. As part of the bidding process, contractors were also expected to put forward notional ideas for improvement. The resulting mixture of means and ends had the potential to combine and produce a very complicated picture. BAA had to manage the process very carefully to ensure that the desired benefits are delivered. Clear targets had to be set, along with agreed intermediate steps towards the ultimate goals. This is where the implementation of 'Strive for Five' came into its own.

Table 14.2: 'Strive-for-Five' Performance Measures for the Pavement Team

Criteria	Cost Management	Quality (1)	Quality (2)	Safety	Time	Environment
GOAL	**World's best life-cycle cost**	**Zero defects**	**Production meets brief**	**Zero accidents in construction**	**World's best time**	**Zero environmental impact**
SCORE						
0.5	Simple systems to collect cost data	Recognised quality system	Recognised quality system	Supplier safety policy and safety manager	Supplier produces project programmes with tangible milestones	Supplier has published environmental policy, responsible senior manager and annual report
1.0	Joint process for budgeting capital and operation costs	Joint quality improvement plans	Agreed definition of 'adherence to brief'	Supplier has formal risk assessment methodology	Supplier ability to plan and resource activities	Agree policy, targets and action to reduce energy
1.5	Joint risk analysis	Statistical process control	Agree feedback process	Agreed joint safety management system	Joint action to reduce delivery times	Agree policy, targets and action to reduce waste
2.0	Joint process for resource levelling	Formal feedback mechanisms	Mechanism for supplier input to design	Joint safety audits	Joint action to improve set-up time and logistics	Agree policy, targets and action to reduce water/chemicals
2.5	Joint procedure for 'should cost' benchmarking	Design and process analysis	Agree method for testing and understanding brief	Supplier implements weekly 'toolbox talks' for site staff	Agree formal mechanism for early warning	Agree policy, targets and action to reduce ozone depleting/hazardous substances
3.0	Joint programme for resource pooling	Regular reviews of improvement plans	Agree improvement plans for above activities	Joint incident investigation/reporting	Joint analysis of non-productive time	Agree policy, targets and action to increase re-cycling materials
3.5	Joint productivity analysis	Formal supplier development programme	Regular reviews of improvement plans	Supplier has formal daily sessions for sharing daily plans with workforce	Earned value measurement is implemented	Agree policy, targets and action to increase end of life re-cycling
4.0	Joint implementation of enabling cost/facility cost analysis	Zero defects during liability period	Supplier self-assessment	Zero incidents during construction and operation	Supplier applies trending and forecasting techniques	Agree policy, targets and action to eliminate hazardous/controlled substances
4.5	100% predictability at end of co-ordinated design	Zero unplanned failures	Zero deviations from brief at handover	Zero accidents during construction and operation	Consistent 'just-in-time' delivery	Agree policy, targets and action to increase use of renewable energy sources
5.0	World's best life-cycle cost	Zero maintenance	Zero deviations from brief at production info. stage	Zero near misses during construction and operation	Consistent 'world's best' time	Zero environmental impact

Appropriate performance measures were established for the team as a whole, and not just AMEC. Initial targets for cost reduction were set, based on Latham's 30%, Egan's 50% and a 'world's best' cost of runway construction (quoted as £36 per square metre at Denver Airport). An initial workshop led the team to conclude that such global targets could be achieved as a result of satisfying other more specific targets. These targets were set within the core criteria framework of: cost management; quality; safety; time; and environment. Specific criteria include: business relationship; training and individual development; processes and systems; research and development; and operational impact. The core criteria and measures established for the Pavement Team are summarised in Table 14.2.

Notes

[1] Handy, C. (1994) *The Empty Raincoat: Making Sense of the Future*, London: Hutchinson.

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[8] Butler, R. (1996) 'What You Measure is What You Get: An Investigation into the Measurement of the Value Added by the Purchasing Department', in Cox, A. (ed) *Innovations in Procurement Management*, Boston: Earlsgate.

[9] Ibid.

Section D:

Towards a Theoretical and Practical Synthesis

Chapter 15: A Way Forward: A Critical Asset and Relational Competence Approach to Construction Supply Chain Management

Introduction

It is clear that many of the organisations discussed in this book have developed more strategically and operationally aligned approaches to the management of their construction supply chains. This is especially true in the cases of Rover Group, McDonalds and Gazeley in the UK and Company X in the US. These organisations, perhaps more than any others studied here, have recognised the need to change in response to the specific dynamic business drivers acting on their respective supply and value chains, in order to remain competitive and achieve sustainable success. They have challenged their traditional approaches to construction procurement, and have engineered more effective and efficient relational strategies, in an attempt to deliver required business benefits. They appear to have understood what, under existing circumstances, is fit for their respective purposes.

When analysing the approaches employed by the companies in this book, a number of similarities emerge concerning the way in which they have begun to think about construction supply chain management, as well as what it is that they believe is important for them to do in managing their supply relationships effectively. This way of thinking can be divided into two categories. The first relates to the way of analysing their strategic involvement in the industry.

The second relates to what they believe it is that they should be doing operationally.

While it is fair to say that these two types of characteristic are not necessarily present in equal amounts in all of the cases studied, they do, however, represent an underlying theme in how 'better practice' organisations are attempting to manage their supply chains proactively. In this chapter, this similarity is analysed and its relevance for other participants in the construction industry is discussed.

Before this it is important, however, to differentiate between the strategic and the operational ways of thinking that our case studies have demonstrated exist in 'better practice' companies. This is important because it will be argued later that, while the strategic approach (way of thinking) outlined here may be appropriate for every company in the construction industry, the operational tools and techniques of most of the case study companies may not be appropriate for every company or practitioner in the industry to adopt.

It is, in our view, only by linking together a strategic way of thinking about alignment, with the specific supply chain and market conditions that confront any actor in the industry, that appropriate operational tools and techniques can be devised. This way of thinking rejects a benchmarking approach and is referred to later as the development of a *relational competence approach* to effective supply chain management.

Similarities in Better Practice Construction Management

What then do the better practice companies in construction appear to be doing at the strategic and operational levels, and what can other practitioners learn from them? There is clear evidence that the companies in this book, although not equally in all respects, have adopted a four-fold approach. This involves the following:

- segmentation thinking;
- a focus on critical supply chain asset management;
- analysis of supply market conditions; and

- 'fit for purpose' strategic and operational alignment of relational competencies.

Each of these four approaches can be described in detail. ***Segmentation Thinking*** refers to a process by which practitioners think carefully about the nature of the supply chains they are involved in and, thereby, begin to differentiate and align the internal operational activities of the company in such a way as to focus exclusively on internal and external customer needs and wants within each specific supply chain. This way of thinking has been referred to elsewhere as the fourth dimension of supply[1]. In essence the company does not assume that there is one approach to making money, but asks the question about how profits can be made within all of the supply chains that the company is embedded in.

Critical Supply Chain Asset Management refers to a way of thinking that differentiates between the types of supply chains within which the company is embedded and the structural properties of each type of supply chain. It normally involves practitioners in assessing the 'relative importance' of each of the resources that are required to provide products and services to the end customer. Clearly, by analysing the 'relative importance' of supply chain resources practitioners will be describing the structure of power that exists within a supply chain. This is called the third dimension of supply. [2]

In this context power means the capacity of a particular supply chain resource to become an asset for a company. An asset for a company means that the ownership and/or control of a supply chain resource is valuable. In order to be valuable the ownership of a resource must have a capacity to allow the company to make profits. Clearly, therefore, within any supply chain some resources will be more valuable assets than others. It follows that some supply chain assets will give a company significant opportunities to make money, and also to control the flow of value in a specific supply chain. These types of assets are referred to here as *critical supply chain assets* (or critical assets for short). Within any supply chain there will, of course, be *complimentary* and *residual assets.* In the case of complementary assets, these are those things in a supply chain that have a relatively high, but not critical importance

for money making, and the control of value flow in a supply chain. Residual assets refer to those things in a supply chain that have only a low capacity to generate profits.

It is clear, therefore, that all companies – whether they are involved in construction or in other sectors – face the same dilemma. Companies have limited resources and must decide – in each of the supply chains that exist – whether or not they have the capacity to own and/or control the critical assets in the chain. Failing this they must choose to provide either complementary or residual assets within the supply chain. Segmentation thinking is, therefore, closely linked to critical supply chain asset thinking. This is because only by properly segmenting and differentiating between the types of supply chains within which the company operates is it possible to begin to align corporate strategy with the structures of power within each of them.

The problem for the company is, however, that it must think both strategically and operationally about supply chain management. At the strategic level the company is concerned to decide, within available resources, whether it has a realistic chance of controlling or owning the critical assets in the chain, or whether it should settle for being the provider of complementary or residual assets. Having made this strategic decision about the 'boundary of the firm' within specific supply chains, the company must then ask itself how it can best manage, operationally, all of those supply chains that flow through the company, given the primary supply chain position(s) it has adopted.

To exist successfully in its chosen supply chain position a company has, operationally, to buy many products and services that are either highly complementary, or of residual importance, to the primary activity that the company is focused upon. For example, Rover make cars (its critical activity) but it also buys toilet paper and pencils (residual procurement) and bespoke construction facilities (complementary procurement). The interesting point about the products or services that any company procures (whether its in pencils or production facilities) is that, while most people think about what is bought in terms of finished products or services, in fact, what is procured is always a supply chain. Within any product or service supply chain there will always be either a high or low

degree of vertical integration, and a variety of competitive market structures in place. It is these structural properties – rather than the finished product or service purchased – that practitioners must manage operationally.

Excellence in procurement competence can only occur, therefore, if the practitioners within a company have a solid grasp of the structural properties of the supply chains from which they buy. By this one means an understanding of the existing structure of power within any product or service supply chain, as well as the capacity for the company to change this balance of power in such a way that an improvement in cost, quality, time (etc.) can be achieved to allow the company to be more efficient and effective than its competitors. This is what is meant by the ***analysis of supply market conditions.***

Having analysed and understood the existing and potential structure of power within a product or service supply chain, a company that wishes to improve operational performance has a number of choices. There are basically only three for the procurement of existing outsourced products and services, as described below:

- It can insource all or some of the supply chain assets from its suppliers and undertake the activity within the boundary of the firm itself;
- It can accept that the product or service should be outsourced, and try to find more suitable offerings from existing suppliers; or,
- It can accept outsourcing, but work ever more closely with chosen suppliers to engineer improvements in their own performance, and in the performance of the supplier's own suppliers.

Obviously, one of the key attributes of operational effectiveness in any company must be the capacity of the practitioners within it to understand when it is appropriate for them to choose each of the three options available to them. Space does not allow for a full explanation of how this might be achieved, although a summary is

provided. Readers interested in a more comprehensive exposition of the ideas presented here should refer to the current literature on this way of thinking and acting that is currently being developed by the Centre for Strategy and Procurement Management (CSPM) at Birmingham Business School.[3]

In general it can be argued that successful companies will tend to be those that are able to achieve a ***strategic and operational alignment of the relational competencies*** that flow through their primary and support supply chains. By primary supply chain one means the specific supply chain within which the company's critical activities are embedded (e.g. the automotive supply chain in the case of Rover, or the air transport supply chain in the case of BAA). By support supply chain one means all of the supply chains that provide the products or services (of relatively more or less strategic importance) that allow the critical activity of the company to take place.

Clearly, in procuring its outsourced assets it is imperative that any company is able to find suppliers with the highest levels of competence possible, so as to be able to provide any given product or service in the most effective and efficient way. In finding appropriate suppliers it is key to the process that practitioners are able, operationally, to understand the most appropriate type of relationship they require with any supplier. Should a relationship be arms-length and conflictual, or should it be more collaborative and consensual? How much information ought the practitioner to expect from the supplier, and how much information is it safe to allow the supplier to have from the buying company? The competent procurement practitioner will also need to know when it is safe to single source from a supplier, when it is appropriate to undertake joint ventures, and when preferred supplier or competitive, multiple supplier tendering is the most effective way of sourcing a given product or service.

The capacity to link all of these operational and strategic supply questions about how to source external products and serviced appropriately is referred to as ***relational competence thinking***. It is a way of thinking which holds that all competent companies will normally possess a way of thinking that allows them to differentiate

between alternative ways of managing external relationships. Furthermore, competent companies and practitioners will be able to link an understanding of strategic and operational activities with the unique properties of particular product and service supply chains, so as to determine when a particular type of relationship should be used to create a specific type of required competence from each and every supplier.

In essence this approach is about aligning strategic and operational practice with ***a portfolio of relationship types*** in order to achieve a desired corporate outcome. This implies that the attachment by any company to one particular form of relationship type, or to any fixed boundary of the firm between itself and its suppliers is bound to be a mistake. Since the balance of power within all supply chains is in a constant state of flux, it follows that all companies must have a flexible and iterative approach to insourcing and outsourcing. Competent companies will, therefore, have operational methodologies that allow them – *within available financial resources* – to select appropriate relationships with suppliers, and know when it is necessary to insource (and also outsource) particular supply chain assets. This way of thinking methodologically is referred to as ***critical asset and relational competence analysis***.

In the next section of this final chapter the relative performance of each of the case study companies in achieving an alignment of their strategic and operational practices with this way of thinking is assessed. Following this a final section explains why, on the basis of this analysis, it is not possible for everyone in construction to create and sustain long-term collaborative relationships, even though many of the companies analysed here have done so successfully.

The key learning point from this study will be shown to be the fact that while it is always appropriate to use critical asset and relational competence analysis within the business, the consequence of using this methodology does not always lead, operationally, to the need for the same types of relational competencies or the same number of suppliers. Since each company has its own unique strategic drivers, and is involved in supply chains with very different structural properties, it is self-evident that what a specific

company ought to do will be uniquely related to its own needs, and cannot be ascertained by copying the actions of others.

Assessing the Performance of Better Practice Construction Companies

It is clear from the research undertaken here that five of the six companies analysed would clearly fall into the category of 'better practice' in so far as the construction industry is concerned. It is important to recognise at the outset, however, that this does not mean that each one of them is fully adopting all of the methodologies associated with ***critical asset and relational competence management***. Clearly, Rover – assisted by its mentor (Honda) – has gone further than any of the other case study companies towards the achievement of an asset criticality and relational competence approach. This does not mean, of course, that Rover (or any of the other companies) have ever heard of this methodology. It simply means that, in our judgement, some of the case study companies can be seen to be closer to achieving what the authors believe to be the 'best practice' way of thinking about business management. It is for this reason that the case study companies are only seen as examples of 'better' rather than 'best' strategic and operational practice.

As Table 15.1 indicates Rover is by far and away the most advanced of the case study companies in relation to critical asset and relational competence management. This is because it has, gradually, come to recognise the importance of particular assets in its primary and support supply chains, and has begun to develop an understanding of effective supply and relationship management. In particular, the company has recognised that although construction is not a primary or critical activity it is, given the regularity and volume of its spend in this area, a significant complementary asset which must be managed appropriately. Managing construction spend appropriately has meant that the company has recognised that it must segment its expenditure and deal with different types of construction activity using a portfolio of relationship management types.

Table 15.1 A Summary of Strategic Approaches in Procurement Management.

	Strategic Procurement Attributes			
Construction Supply Chain	Segmentation Thinking	Control of Supply Chain Assets	Analysis of Supply Market conditions	Strategic and Operational Alignment
Rover	●	●	●	◍
McDonalds	●	◍	◍	●
BAA	◍	◍	◍	◍
Gazeley	●	●	◍	●
Shimizu	◍	●	○	○
Company X	●	◍	●	◍

Key:

● = Excellent Example
◍ = Good Example
○ = Poor Example

Where it has low value spend, with many potential suppliers available in the market, the company has chosen not to dedicate any major internal resources and has used competitive, market leverage relationships to simplify internal and external transactions. In high volume and high value expenditure the company has, however, adopted a very different approach. Here the company has recognised that it can achieve leverage of quality, time and costs through the use of single and preferred supplier relationship management. Clearly, the company understands the power that regularity of spend provides, particularly when it is associated with effective cost and performance management techniques. It is in these areas – where the potential opportunity for improvement is high – that the company has successfully focused most of its internal and external effort. This demonstrates a high degree of procurement competence at the strategic and operational levels.

McDonalds provides an equally valuable example of a company knowing what is the appropriate thing to do given the specific circumstances that the company faces. Like Rover, the company has not favoured any single approach to supply or relationship management but, for its major areas of construction expenditure, it has recognised the value, on occasion, of single sourcing and, more frequently of preferred supply relationships. Like Rover, McDonalds has a healthy concern for the misguided creation of supplier dependencies, and has chosen not to create 'partnerships' except when the dependency can be controlled effectively, or the operational efficiency outweighs any downside risk. Furthermore, McDonalds' innovation with modularisation and standardisation is an excellent example of the development and use of a well established construction method, but when it is clearly 'fit for purpose' strategically and operationally. In this case it is speed to market rather than cost reduction that is the primary driver of supply and relationship management.

BAA is a more transitional case. The reason for this is that, although the company is one of the leading enthusiasts for innovation and improvement in construction procurement and supply management, it is prepared to experiment with quite radical solutions. In our view, in some of these approaches – especially the single source concrete pavement relationship – there is a danger that this may create a degree of supplier dependency that may be seen to be unacceptable in the future. Despite this there is little doubt that BAA has made considerable steps in transforming itself from a relatively moribund and traditional construction procurement client before privatisation. The innovations in performance management and standardisation described here, and the move to a more proactive cost management methodology, are all examples of significant operational improvement in the company. This has clearly been based on a significant improvement in procurement and relationship management competence.

Gazeley Properties provides an extremely interesting case of a well-run company that performs exceptionally well in a specific construction supply chain. Like Shimizu, Gazeley is involved in construction as its primary supply chain activity. All of the other cases analysed in this project have been of clients buying

construction as an important complementary asset. Gazeley is not, however, an integrated construction company. Gazeley has successfully segmented construction supply chains and defined its own role, and the 'boundary of the firm,' in terms of the property developer and manager role within the distribution/retail construction supply chain. The company has clearly understood the need to align strategy and operational practices around its critical activity as impresario of the supply chain. In doing so, however, it has recognised that it must have a portfolio of relationship management types for the specific construction competencies required. The company has, therefore, eschewed simplistic approaches based on 'partnership' ways of thinking and has achieved effective leverage through professional, if still largely reactive, procurement management.

Shimizu is an extremely interesting case because many people have looked to East Asian practices in general (and Japan in particular) for their analysis of 'best practice' in business management. Shimizu is, however, in our view, the least successful of our case study companies. The reason for this is that it has historically relied on close collaborative working relationships, without understanding that these types of relationships may not be the most appropriate to achieve the new competence requirements that are required as circumstances change. Thus, while close collaborative working with suppliers, through the creation of structured hierarchies of control and dominance, was appropriate in the growth economy of the past, Shimizu is now coming to recognise that arms-length approaches to supply management with a new breed of suppliers may be required under more recessionary economic circumstances. There are clearly lessons here for those who believe that collaborative 'partnerships' will always be the most appropriate way to manage construction supply chains.

Company X, in the US, is our final case study company. It is an example of a client requiring construction as an important complementary asset for its primary activities in a dynamic research based industry. Like BAA, Company X represents a transitional case, but of a company that had gone too far down the route of supply dependency through single sourcing. The company has recognised the folly of this approach and has started to develop a

segmentation and alignment approach around the development of a portfolio of relational competence types. Today, the company has also recognised the benefits of a focus on standardisation through leveraged preferred suppler relationships.

The two major challenges to this move to 'better practice' construction thinking are, however, the problem of internal operational alignment, and the need to develop a more pro-active approach to cost management with its suppliers. Despite this the Company X case demonstrates once again that procurement competence is always focused on the ability to choose the most appropriate form of effective leverage of suppliers given the contingent circumstances facing the buyer. Company X has recognised that is not able to leverage suppliers effectively by single soured collaboration, and has demonstrated the benefits that can occur if the client ends its own self-induced folly.

A Way Forward: On the Nature of Procurement Competence in Construction Management

What, then, are the key learning points for practitioners and academics from this study? One of the most important must be that the penchant for a simple 'catch-all' solution, that is seen as the way forward for everyone in the industry, must come to an end. The reason for this ought to be self-evident. Construction is not a single supply chain with everyone undertaking the creation of the same or similar end product. This is *not* the automotive sector with its relatively standardised products serving well-defined customer segments and niches. On the contrary, while it surely must be possible to achieve a degree of improvement in modularisation and standardisation in the industry, it is simply wrong-headed to assume that because it may be desirable, its achievement is inevitable.

The fundamental problem is that what *is* achievable in construction supply chains can only be determined by first starting from an analysis of the structure of power that exists within them. It cannot start from an assertion that, because, something could be done, then it will be done. [4] The problem is that many things can be done, but what gets done always depends on who has the *power* in the supply chain to bring it about. If we start from this premise it

becomes clear why it is that trying to copy what was appropriate in the automotive sector, or any other sector for that matter, simply cannot be the most appropriate thing to do. Unless we first understand the structural properties of the supply chains that exist within the construction industry it is doubtful that any of the well meaning recommendations for reform, or the calls for 50 or 30% cost reductions will be achieved.

This must surely be the key learning point from this study, but there are others. As important as the need is for us to understand the structural properties of construction supply chains, there is a desperate need within the industry for companies at all stages of supply to understand better what procurement competence is. Procurement competence is the ability to know, not just one, but the full range of relationship management approaches available to buyers, and when it is appropriate to use these under specific contingent circumstances. This is not, in our view, well understood by many in construction – or for that matter – elsewhere in industry.[5]

What is interesting about the cases in our study, however, is that there is evidence that some companies do understand how to develop a focus on procurement competence in construction. Interestingly enough, most of the companies analysed here have developed, and appear to use, a wide portfolio of relationship management styles. Furthermore, they have all recognised that whichever approach is chosen, it must be operationalised to achieve more *effective leverage* of suppliers. In this way close, collaborative relationships are often used, but only as a means of imposing a more rigorous cost and performance environment on the supplier.

There are lessons here for those who simplistically believe that collaboration based on trust alone, without an effective hierarchy of control in the relationship, can achieve improvements in construction outcomes. Clearly, procurement competence requires buyers to be able to place themselves in positions of effective control over their suppliers whenever it is possible to do so. This means, of course, that they must also recognise (and be sensitive to the fact that) suppliers have their own agendas, which may not be

the same as that of those to whom they provide products and services.

This is just another way of saying that 'better practice' in construction is always about the effective management of power in supply chains between buyers and suppliers. Our considered view is, as a result, that more attention should be focused in the industry on understanding how to manage the structural properties of supply chain power under changing contingent circumstances. In focusing this way, perhaps, in the future, the industry will recognise that there is no single way to best manage construction procurement. On the contrary, what is best will always be that which is the most appropriate under the particular circumstances facing us.

The problem in the industry appears to be that there is far too much concern for finding '*the solution*' and inadequate attention being paid to the need to understand the supply chain circumstances in which a variety of solutions might be appropriate. To focus this way is clearly to search for an understanding of what is 'fit for purpose' in any construction supply chain circumstance. There is still considerable work required, in our view, before this way of thinking is properly understood in the industry.

This conclusion does not come easily because there are many well meaning individuals whom have devoted considerable time and effort to the search for '*the solution*' for the industry. Ironically, having just had the *Latham Solution* recommended by a previous Conservative government it is now clear that the new Labour government is keen to find yet *another solution*. It has recently established a new working party on construction under John Prescott, the Deputy Prime Minister, that appears to have the simplistic view that it will be possible to find an exemplar company in construction – like Toyota in the automotive sector – to show everyone in the industry how to be more efficient and effective. [6]

Our own view is that such thinking is misguided because it simply fails to recognise that construction as an industry is constituted of a wide variety of supply chains delivering many very different products and services to specific clients and customers. Furthermore, the structures of power within each of these supply chains varies considerably, and is in a constant state of flux. In this type of environment we believe that it is a recipe for disaster for the

industry – having recently arrived at one overly generalised solution (the Latham Report) – should spend its valuable resources in the search for an exemplar company. In our view, like the search for the 'Holy Grail', such an approach will be yet another exercise in futility.

Why are we so convinced of this, and why do we reject the *Latham Solution* (or any other single solution) as the way forward for construction? The reason is because all of the research undertaken by the CSPM at Birmingham University into procurement competence in a wide variety of industries, has led us to the conclusion that business success starts, not from the benchmarking or copying of what others do, but from an understanding of the 'first principles' of business management. By this one means that practitioners must understand what their primary supply chain strategy is, and align their operational activities in each of their support supply chains in such a way that effective leverage of the cost, quality and time constraints created by their current suppliers can be achieved.

All of the research undertaken at the CSPM indicates that this can only be achieved if practitioners have procurement competence. This means that they will know what the full range of tools and techniques available to them is in managing external resources and suppliers. Second, they will know what are the contingent circumstances within which they operate. This implies a knowledge of the structural properties of the supply chains that the company sources from. Third, they will understand the concept of appropriateness. By appropriateness one means an ability by practitioners to link a knowledge of the full portfolio of supply relationship management tools and techniques, with the specific contingent supply chain circumstances facing them, in such a way that any given strategic goal of the company is achieved. Appropriateness will always, in this way of thinking, be about achieving the conditions for the more effective leverage of the company's position *vis-à-vis* its customers, competitors and suppliers.

This way of thinking, about the transformation of existing structures of power through the effective leverage of supply chain relationships is the reason why authors find it difficult to accept that

the search for '*the solution*' (or '*the exemplar company*') is misguided. It is clear to us that both of these ways of thinking about effective business management are misguided. This critique can, perhaps, best be understood by focusing on why it is that the *Latham Solution* cannot be appropriate for everyone in the industry.

Despite the elegance of the ideas that the Latham Report contained, it is our view that the thinking it was based on was partial. The reason for this view is because of the basic idea in the Report, that greater efficiency and effectiveness can be achieved by persuading industry participants to construct a 'win-win' collaborative, team approach. In our view persuasion is rarely the reason why people do things in business. People do things in business and in life, normally, because they must, not because they choose to do so. People can only do what they would like to do when their basic economic needs are, by and large, met. In an industry like construction, in which there are few real barriers to market entry and in which there is a surfeit of supply and inadequate demand, encouraging people to be 'other-directed' is a recipe for a myriad of implementation committees. Such a recommendation is hardly likely to be, therefore, a recipe for fundamental and profound change in industry culture or structure, as has been witnessed through the post-Latham initiatives. The reason for this is not because of the malicious intent of people, but because the structural circumstances within which individuals find themselves forces them to behave in certain ways.

Many readers may have been affronted by what has been said above because they can point to a number of UK examples of clients, contractors and sub-contractors achieving considerable cost improvement and efficiency in quality and time through closer, and more collaborative working relationship. Let as look at this in more detail. Why is it, despite what has been argued here, that some companies, notably BAA, McDonalds and Rover in the UK, have been able to achieve considerable success through the adoption of a more long-term collaborative approach to their construction spend? Anecdotal evidence from these industry players has clearly suggested that significant performance improvements can be arrived at through long-term relationships (and/or through

standardisation of building methods). While it may be true for these particular organisations, it does not follow that this constitutes grounds for arguing that everyone in the industry can, or should, operate in precisely the same way.

Having studied the activities of a number of companies involved in significant performance improvement in construction in recent years, it is evident that there are clear and unambiguous structural reasons why these improvements have been possible. Furthermore, given this fact, there are also clear and unambiguous reasons why it is highly unlikely that these performance improvements can be achieved by the majority of players in the UK construction industry, whatever Latham or the new Prescott Working Party may believe to the contrary.

The major case studies analysed here have involved companies that have a regular and relatively high level of demand for construction work. Only two of the companies analysed were involved in construction as their primary activity, while all of the remainder were clients purchasing construction as an important complementary asset. Having analysed their recent actions, it is clear that these clients, through the use of a variety of fairly common-sense methodologies, have found a variety of ways to achieve significant improvements in time, cost and/or quality. So far so good, so why cannot everyone do the same? The reason is simple enough. The companies concerned have been able to engineer their improvements by providing an appropriate trade-off that creates a *coincidence of interest* with their construction suppliers.

This trade-off is simple enough to understand. The clients analysed have been able to guarantee a regular and high level of demand, in return for a willingness by preferred contractors (and/or sub-contractors) to be prepared to accept a degree of structural control and dominance by the client over their normal way of doing business. This is a relationship of pure power, in the sense that the supplier has to be prepared to forego or reduce the potential for opportunism against the client, in return for the buyer's promise of work in the future. In the current climate in the UK industry, with low operating margins and few technological resources that allow suppliers to monopolise the supply market against potential clients,

it is hardly surprising that such regular spending clients have been able to bend some of the suppliers in the industry to their needs.

Two interesting questions flow from this. First, is this approach appropriate for all clients to use, under all circumstances in construction? Second, what does this case study evidence tell us about the historic construction procurement competence of major clients in the past? Taking the second of these questions first, it is clear that historically most construction clients were, and in some cases still are, relatively incompetent in understanding the first principles of business leverage and the effective management of supply chain power relationships. Everything that has been done in recent years, under the banner of 'best practice' in construction in the UK, is nothing more than the adoption of a common-sense approach by a number of clients. These clients have been driven towards a more logically rational and appropriate approach because of intensifying competitive pressures in their own industry sectors, or due to privatisation introducing market disciplines to formally ossified management structures and practices.

Rather than applauding most of these companies for developing world class practices (as many seek to do) our own view, therefore, is that they are doing nothing more than simply adopting a common-sense approach to effective supply chain leverage. This is because they each possess a regular, process spend, that provides them with the potential to leverage their supply chains effectively. Now, for the first time, they have been able to recruit (or free) one or two able people, who understand what business is about, and who have begun the process of turning the *potential power* that they have always possessed into *actual power*. What is surprising is not that this is now being done, but that it has taken so long for these companies to wake up to the opportunities that have been so manifestly before them.

What is perhaps more worrying, however, is the still large number of private sector clients (and contractors) in the construction industry with this type of potential, but who do not appreciate the fact. These private sector companies do not understand the concept of appropriateness and still have some way to go in actualising the potential power that they possess. The situation in the public sector is even more lamentable. It is clear

from our research that nobody in this country has ever really begun to address the issue of the potential buying and leverage power that resides in the public sector, whether in construction or elsewhere in the economy. The commitments to PFI, CCT and market testing that have bedevilled the public sector construction spend in recent years are, in our view, symptomatic of a complete blindness, by governments and civil servants alike, to the nature of buyer and supplier power in supply chains. It is clear that there is a significant ignorance in government to the possibilities for significant cost, quality and time improvement in public sector construction procurement through effective leverage, based on the horizontal, vertical and quasi-vertical integration of construction supply chains. The *potential power* that exists is not understood and nor are the mechanisms to actualise it.

Turning from why there is some evidence of 'better practice' in construction procurement in the UK, to the question of whether or not everyone is capable of copying what BAA, Rover and McDonalds have been able to achieve using long-term collaborative relationships, it is clear that a pessimistic view must be taken of the general possibilities for the majority of actors in the construction industry. This will clearly be a disappointing conclusion to have arrived at for those, like the supporters of the Latham Report, who are wedded to simplistic stakeholding and partnership sourcing solutions to all business problems. It is, however, not necessarily a cause for concern that long-term collaborative relationships cannot be used by the majority of actors in the construction industry.

The major reason, why the practices adopted by Rover, McDonalds and BAA are not available to the majority of actors in the construction industry is because they do not occupy the same structural types of supply chains as these three companies, and they do not have the same power potential within the industry as these cases do. This means that to pursue long-term contractual relationships is likely to be a highly inappropriate thing for many actors in the industry to do to achieve their own business goals.

Let us consider this for a moment in more detail. It was argued earlier that many of the better practice clients in UK construction operate with a high level of construction spend (relative to the volumes in the industry as a whole) and they have a fairly regular

level of demand for similar types of construction activity within that spend. This provides them with a unique position within their own particular construction supply chains. It gives them a high degree of potential power over their suppliers within the exchange relationships that occur whenever they come to market. To put it at its simplest: the supplier needs the buyer more than the buyer needs any particular supplier.

This is clearly a very useful position to be in when conducting any business related negotiations. This is because, if the buyer organises his negotiations and selection processes professionally he will be able to leverage the supplier most effectively. Obviously, the most effective way for the buyer to exert leverage over the supplier (i.e. bend the supplier to the buyer's wishes) is for the buyer to limit the number of suppliers who are awarded contracts (being careful at the same time not to create any dependency relationships), in such a way that a group of preferred suppliers are created. It helps, of course, if the preferred suppliers are desperate for the work and are not in a position to turn it down (i.e. they are dependent on the buyer) or in a position to behave opportunistically when other work comes along.

Clearly, in the structural supply chain position described above, the buyer is in a position of structural power *vis-à-vis* the suppliers in the industry. It would be surprising, in these circumstances, if the buyer would need to rely over much on the enforcement of performance improvements, or compliance with performance benchmarks from the supplier, through the threat of contractual terms and conditions. The buyer rarely needs any recourse to the contract (i.e. it can stay in the draw), because the power in the relationship is so much with the buyer that the supplier knows that even if a battle over a particular claim (legally speaking) is won, it will risk the loss of the war (i.e. it will not be awarded any more work in the future).

But is this situation of relative power and dependency the condition under which the majority of building work in the UK operates? It is our view that this condition, based on clients possessing a structured and regular process-spend for similar types of construction products and services, is unlikely to constitute more than 25% of the total construction market in the UK. This is

because the majority of construction expenditure is for one-off project-specific items that are often bespoke to the needs of individual clients and which have to be built under very different ground conditions and contingent supply chain circumstances.

In such project-specific supply chains everyone, including the client, has an objective incentive to behave opportunistically. The reason for this is because the buyer rarely returns to the market more than once for the product or service and, consequentially, lacks either the expertise or the competence to understand in detail what it is that is being purchased. As a result the buyer, having no regularity of spend to offer suppliers, lacks the power to be able to enforce his wishes on the supply chain.

Similarly, because the majority of clients find themselves in this position and have to rely on the supply industry for their competence, in this type of supply chain the suppliers are potentially more powerful than the buyer at the point at which any contractual negotiation takes place. This is, however, both a strength and a weakness for suppliers. This is because in this type of supply chain structure, it is normal that the supply industry becomes highly fragmented, with many different actors (engineers, architects, project managers, main contractors etc.) seeking to claim that they have the supply chain management competence that the client needs. There is, as a consequence, likely to be a surfeit of supply, both of professional and managerial advice, as well (because of the low financial and technical barriers to entry) as a surfeit of trades people to undertake the work.

The result of this fragmentation and intense competition is that no one group of suppliers is able to win sufficient amount of the business to allow them to effectively control and manage their own supply chains effectively. There are two reasons why. In the absence of an ability to dominate the supply industry no one is able to so control demand to allow them to rationalise and leverage the supply industry to provide a performance improvement barrier to entry. Second, because buyers recognise their own relative incompetence and impotence, they have a vested interest in encouraging a highly competitive and fragmented supply-base to exist. This is because, economic theory tells them that where there is a multiplicity of interchangeable supply, margins will be keen and

they will be able to behave opportunistically in the use of contracts that force the supply industry to take and to manage all of the risks inherent in any construction project.

The suppliers, given that there are so many of them, have no real choice other than to acquiesce to this type of supply chain structure. They have to accept the effective leverage position that they find themselves in and try to pass any consequential risks that flow from it down the supply chain to their own sub-contractors. This is because, in the absence of regular demand, they must behave as opportunistically against their own suppliers, as the clients are behaving towards them. It is hardly surprising, therefore, in this type of supply chain that legal claims are rife and contractual disputes are endemic to supply relationships.

Our own view of this structural reality is somewhat different to that of some recent commentators. Rather than being concerned with this situation we accept it is a fact of life. In an absence of a willingness by government to induce, or major industry players to voluntarily agree to the creation of an oligopolistic industry structure, there seems little prospect of goodwill destroying the structural properties which underpin the project-specific construction supply chains that dominate around 75% of the work in the industry.

Obviously, while there is tremendous scope for clients and their suppliers in process-based supply chains to engineer efficiency improvements collaboratively over the long-term, it is wholly unrealistic to assume that this will be equally as possible in the project-specific supply chains that constitute the bulk of current construction activity. Thus, rather than encouraging practitioners to search for something that is unachievable and inappropriate for most of the actors in the industry, we believe that it would be more sensible for the industry to recognise the need for a differentiated approach to effective leverage in supply chains. This will involve practitioners in analysing the structure of supply chain power and developing procurement competence in appropriately linking the full range of relationship management styles with these contingent circumstances.

The industry has much to learn, although the cases in this volume point the way forward for those who have the eyes to see

what procurement competence might be. For those interested in improving their own level of construction procurement competence two companion volumes by Andrew Cox and Ian Thompson ***Contracting for Business Success***, (Thomas Telford, 1998) and ***The Contract Selection Toolkit*** (Earlsgate Press, 1998) are also recommended. Hopefully, this volume will have also assisted by pointing the reader in the direction of supply chain appropriateness. This is, in our view, one of the most important attributes of procurement competence for all areas of business management thinking, as well as for those seeking to improve their performance in construction supply chain management.

Notes

[1] For a more inclusive analysis of this way of thinking see: Cox, A. (1997) *Business Success: A Way of Thinking About Strategy, Critical Supply Chain Assets and Operational Best Practice,* Boston, UK: Earlsgate Press.

[2] Ibid.

[3] Cox, A. and Thompson, I. (1998) *Contracting for Business Success*, London: Thomas Telford.
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[4] This issue, which is associated with the problem of 'purposive actualisation', is discussed in more detail in: Cox, A. (1997) *Business Success, op cit.*

[5] Cox, A. (1997) 'On Power, Appropriateness and Procurement Competence', *Supply Management, op cit.*

[6] For further elaboration of the misguided idea that the problems of construction can be resolved by finding an exemplar company, like Toyota in the car industry see: Cox, A. and Thompson, I. (1998) *Contracting for Business Success,* London: Thomas Telford, pp. 56-62.

[7] For further elaboration see: Cox, A. (1997) 'On Power...', *op cit.*