1 Introduction

1.1 Introduction

The management of construction projects has been carried out since people first cooperated to erect buildings, yet there is little documented knowledge of how people interacted in this process. It is revealing that historical and contemporary accounts of construction work pay little attention to how people worked together and managed their activities. Writers over the ages have concentrated upon the buildings themselves, particularly on aesthetics, the use of new materials, technological developments and the impact of buildings on their environment. How people were organised and managed received scant attention until recent times. What was written tended to be about such charismatic characters of enormous ability as Brunel and Wren, and not about how they structured their organisations.

The way in which available skills are provided and used is of paramount importance in providing what clients expect from their projects. There is little point in the construction industry developing the special skills of its members if no one is going to amalgamate them in the best manner to meet a particular client's objective.

The conventional method of organisation for construction projects, by which is meant one in which the architect or engineer is the designer and manager of the process using specialist consultants with the construction contract awarded by competitive tender after the design is substantially complete, evolved in contexts (environments) that were considerably more stable than those faced today by both the construction industry and its clients. The complexity of the conditions within which the construction industry's clients now exist makes them place increasing demands upon the industry in terms of the performance of projects (both functionally and aesthetically), the capital and running costs, environmental and sustainability demands and the time required from conception of the project to occupation. This has come about as a result of technological developments, globalisation, uncertain economic conditions, social pressures, political instability, and so on. Such forces have led to the
emergence of stakeholders in projects: that is, organisations, institutions and individuals that are not formally clients but can claim a socially/commercially acceptable interest in projects which clients are required to acknowledge and respond to. Thus, generally, the term 'client(s)' used in this book also incorporates 'stakeholder(s)' as appropriate. The distinction between clients and stakeholders is covered in Chapter 4.

Within such conditions, clients from both private and public sectors have to increase their effectiveness to remain competitive and to satisfy their own clients who transmit the demands of a complex world to them. The construction industry has in turn to respond to demands from clients that arise from such conditions and is itself also subject to external pressures in a manner similar to that of its clients. It therefore needs to respond by mobilising the talents it possesses in a way which recognises the particular needs of individual clients. It has become clearly recognised that it is unreasonable to suppose that the conventional way of organising construction projects remains a universal solution to producing a project in today's conditions.

The complexity of clients' demands, together with the increasing complexity of building, civil and industrial engineering and other construction work, particularly as a result of technological developments, has over the years resulted in increasing specialisation within the construction industry. The professions associated with construction emerged as separate skills (e.g. architecture; quantity surveying; structural, mechanical and electrical engineering; acoustics and safety), as have the many specialist subcontractors. On any project, even a small one, large numbers of contributors and skills are involved. On the largest, there is a vast range of skills and materials required and an enormous variety of people and equipment to mobilise. Where these projects are carried out overseas, there are many additional issues of culture, logistics and language. Fundamental to the management of construction projects is therefore the way in which the contributors are organised so that their skills are used in the right manner and at the right time for the maximum benefit to the client. There is little point in the construction industry developing its skills if they are not then implemented effectively.

The way in which the industry and its skills and professions evolved has compounded the problem of organising effectively as it was reinforced by professional allegiances which, in the United Kingdom and elsewhere, were compounded by the establishment of professional institutions, which in turn contributed to the division of the design professions and their separation from construction firms. Specialisation has been accompanied by the creation of independent companies offering the specialisations, and the complexity of construction has led to greater interdependency between the specialisations and hence between companies. Whilst this has also led to the amalgamation of many specialist firms into multidiscipline firms, nevertheless, a high level of differentiation continues to exist within the construction process together with a consequent need for strong integration between independent specialist companies and between specialists within the multidisciplinary organisations.

It was against this background that the conventional solution to project organisation attempted to cope with increasing complexity and uncertainty leading to the development and increasing use of alternative approaches such as design-and-build, management contracting and construction management and initiatives such as partnering and prime contracting. There are now many
alternative forms of organisation for construction projects, but there remains the need to select the most appropriate for each specific project. So what is needed is a framework for designing an organisation structure to suit the particular project in the conditions in which it has to be executed. Pressure from clients has made the professions and industry take more seriously the need for organisation design, which is a key to the ability of the project management process to be effective.

It should be clear by now that this book views a most important element of project management as an organisational issue which incorporates the way in which people are organised and managed in the project management process. This is a long step from the view of project management still taken by many who see it as a collection of planning and control techniques and other management and decision-making tools which, historically, appear to be the root of project management generally, particularly in the United States (Johnson 2013). The distinction is important as the use of techniques and tools, however sophisticated, will be of no avail if they are applied within inappropriate organisation structures seeking to achieve misguided objectives. Objectives and organisation must come first if the use of planning and control techniques is to be effective in providing the information on which management decisions can be based.

While the terminology in this book is drawn from building rather than civil engineering, the application of organisation theory is as relevant to civil engineering as it is to building. The design of both civil engineering and building project organisations will benefit from the application of the ideas arising from the issues discussed here. Project management is now fully accepted as fundamental to the success of projects by both sectors, demonstrating the parallel need identified by sponsors and managers of projects. Further progress will be made through a fuller understanding of the basis of project management, which will arise from a wider knowledge of the theoretical work identified in this book.

1.2 Evolution of Project Organisation

The way in which construction projects are organised in different countries has evolved from traditions and conventions laid down in each country over many years. The traditions and conventions of the United Kingdom have had a particularly wide significance as they have been exported to many parts of the world over the last two centuries. A very brief account of project organisation evolution in the United Kingdom may help to explain the position reached in trying to develop more effective ways of managing construction projects. It will have been paralleled in many other countries. Whilst many magnificent buildings were built in the United Kingdom in the centuries before the Industrial Revolution using traditional methods of construction and organisation typical of their time, the advent of the Industrial Revolution saw the beginning of revolution in the way in which the buildings needed by the new industrialisation were constructed and managed. The accompanying prosperity created demands for buildings for the new industries, housing to accommodate both workers and owners and demand for improved transportation all of which led to the development of new engineering and building techniques. These activities created
a concentration upon the specialist skills of the members of the building industry. The increasing importance of the engineer emerged; there was the further separation of the architect and builder as specialists; quantity-surveying skills were more firmly identified; and engineering was subdivided into civil, mechanical and electrical skills. However, this was an incremental process and specialists often acted in dual capacities. The new complexity of the conditions within which construction work was executed, with greater emphasis on economy, value and prestige, the complexity of new building materials and technologies and the developing skills of the building industry specialists themselves led to the establishment of societies for the discussion of common problems. Architectural clubs were formed in 1791, but clubs for civil engineers had been set up as early as 1771. In 1834, clubs were established for surveyors and for builders. Subsequently, to protect themselves from economic pressures on the one hand and from the unscrupulous on the other, the clubs developed, in the nineteenth century, into professional institutions as the means of defining their position and creating their public image through the acquisition of royal patronage. This further emphasised the separation of the skills associated with construction and so reinforced allegiance to specialist skills rather than the industry as a whole and created the basis from which today’s ‘conventional’ organisational structure for construction projects has grown.

By the late nineteenth century, architects were seen to be concerned primarily with prestigious buildings and no member of the Royal Institute of British Architects could hold a profit-making position in the building industry and retain his membership. Further separation of architects from engineers followed the development of industrialisation as the position adopted by architects decreed that industrial building was the province of engineers but, at the same time, engineers were commonly employed to advise on the structure of architect-designed buildings in addition to their core work on infrastructure projects. Hence, architects were technically dependent upon engineers but engineers were not dependent upon architects, and engineers did not exclude themselves from being principals of engineering or building firms. Further separation occurred when the Royal Institution of Chartered Surveyors prohibited its members from being employed by construction firms. Bowley (1966) describes the pattern that emerged as ‘the system’ and believed that it had acquired a strong flavour of social class distinctions, architects being the elite. Engineers were associated with trade and industry, surveyors were on the next rung of the social hierarchy and builders were regarded as being ‘in trade’. Whilst building activity between the First and the Second World War was much greater than before 1914, the period was one of consolidation of the main professions through the establishment of professional qualifications tested by examination and of codes of conduct, which raised their status and reinforced adherence to the established pattern of project organisation.

Even present-day organisation arrangements for building projects reflect, to a degree, the conservatism generated by patterns laid down before the Second World War. However, following a succession of official reports on these topics, the professions and industry responded to the demands of environments infinitely more complex than those in which these patterns were originally established. The dramatic developments in transportation; communications; health
care; manufacturing technologies and the associated economic, social and technological order have been powerful forces for client-led change in the construction industry.

**The Second World War and Post-War Activity**

The impetus to innovation provided by the Second World War was dramatic and focused upon the need for economy in labour and reduction in the use of materials in short supply. Wartime also generated the first governmental enquiry directly concerned with the organisation of building work (HMSO 1944). Nevertheless, this report accepted the established patterns and concerned itself, primarily, with tendering methods and arrangements for subcontractors.

Following the Second World War, the demands placed upon the building industry rapidly increased in complexity due to many factors, for example need for rebuilding in the aftermath of war, development of the Welfare State, increased sophistication of industry and the need to redevelop cities to cope with a more technological age. Yet again, the pattern of organisation of projects remained largely unaltered. Nevertheless, there were some innovations in organisation patterns through the use of negotiated tenders and ‘design-and-build’ but the resistance to change of the established pattern is illustrated by the reluctance of public authorities to adopt selective, as opposed to open, tendering even though this had been strongly recommended in the Simon Report (HMSO 1944) and again in the Phillips Report (HMSO 1950). Following the Second World War and the Phillips Report and the difficulties of the conventional pattern of organisation in coping with the demands of modern construction, discussion increasingly centred upon the need for greater cooperation between all parties to the construction process. However, the greater spirit of cooperation within the industry that had begun to emerge took place against the backdrop of the existing traditions and was not concerned with a fundamental reappraisal of the existing structure. This situation was reflected in the next major official enquiry, the Emmerson Report in 1962 (HMSO 1962), which reiterated the findings of the previous two reports regarding the need to improve coordination of the members of the building team.

**The Significant Reports of the 1960s**

Whilst also being concerned with other aspects, for instance training, the Emmerson Report was significant for its observations on relationships, particularly a lack of liaison between architects and the other professions and contractors and between them and clients. It commented, ‘In no other important industry is the responsibility for design so far removed from the responsibility for production.’ The report pointed out that although a common course of initial study for designers and producers of buildings had been recommended in 1950, no practical steps had been taken by 1962. Emmerson came to the conclusion that there was still a general failure to adopt enlightened methods of tendering in spite of the recommendations of earlier reports. His recommendations in this respect led directly to the establishment of the Banwell Committee in 1962. The resulting Banwell Report (HMSO 1964) and its review Action on the Banwell Report (HMSO 1967) had a significant impact. A particular concern
was the unnecessarily restricted and inefficient practices of the professions leading to over-compartmentalisation and the failure of the industry and its professions to think and act together. The 1967 review noted that the professions had done little to de-restrict their practices. The review was encouraged by the increase in selective tendering and urged further consideration of serial and negotiated tendering. The Banwell Report also related to civil engineering as well as building. The Emmerson and Banwell Reports brought into sharp focus the need to reform the approach to the organisation of construction projects. At the time, construction project management was seen to be a passive procedural activity but the movement towards a more dynamic integrated approach was being suggested by Higgins and Jessop (1965) in a pilot study sponsored by the National Joint Consultative Committee of Architects, Quantity Surveyors and Builders. They clearly identified that the problems of communication in the building industry were created to a large extent by attitudes and perceptions about the values of contributors to the building process. They were probably the first to suggest that overall coordination of design and construction should be exercised by a single person (or group). Concurrently, a review of the construction industry by the National Economic Development Council (1964) was calling for similar improvements. A rather rhetorical report by the Institute of Economic Affairs (Knox & Hennesey 1966) was also condemning the restrictive practices of the professions.

This spate of activity and concern with the performance and organisation of the industry and its professions marked the beginning of self-examination. It was induced, to a large degree, by external pressures that reflected the greater complexity of the influences at work upon the industry and its clients. The economic expansion of the early 1960s and rapidly developing technology and changing social attitudes were manifested in demands for more complex and sophisticated projects and a more economic utilisation of resources. These forces were transmitted to the industry through its clients and also directly affected its techniques and attitudes, but such self-examination was likely to be slow when undertaken in the presence of the polarisation of skills and attitudes inherent in the professional structure that had emerged over the preceding century.

**The Project Manager Initiatives**

During the 1960s and subsequently, progress was made in developing collaborative work and skills and in instituting procedures that provided a variety of organisational patterns, particularly in connection with the introduction of the contractor at various stages of the design process. However, there was still a need in official reports in the 1970s (National Economic Development Office 1975, 1976, 1978) to stress that more attention should be paid to structuring and managing project organisations to create conditions for cooperation between contributors. Each of these reports recognised the distinctive nature of the project management process and the role of the project manager and reflected the changes in attitudes and views expressed since the mid-1960s. Accompanying these developments were challenges to the professions from the Monopolies and Mergers Commission in relation to their codes of conduct and fee scales. Project management concepts and applications began to emerge in other industries as project management was seen to be appropriate to managing
in the newly emerging environments but construction presented distinct elements due to its amalgam of professions and structure of its industry. The professions’ and industry’s response to these influences reflected the manner in which the conventional structures emerged. Each sector pursued its own approach to project management while recognising rather reluctantly that the role of project manager was not the right of any one profession.

A reflection of the uncoordinated empirical evolution of project management as an activity separated from design skills is given by the number of definitions that emerged. The Chartered Institute of Building’s (1979) paper identified 13 definitions. It commented that the confusion of terminology and usage was unsatisfactory and proposed a further definition! It was, perhaps, to be expected that those writing on such an important emerging idea, which was contrary to their traditional backgrounds, should seek to express their ideas in their own words. As to be expected, this resulted in a range of definitions that tended to reflect the particular background and experience of the writer rather than a generalised definition of the concept. However, definitions of project management have now achieved a good measure of consistency. The empirical nature of publications on project management was reflected in their emphasis on defining the jobs to be done by a project manager at various stages of a particular project rather than identifying the concept and process of project management. Nevertheless, such publications have been useful in emphasising the patterns that can be adopted with advantage to the client. Against this background, a number of project-based initiatives emerged. The project manager idea was only one such idea that was used to cover a range of organisational patterns. Others included management contracting, design and construct contracts and construction management all of which seek to increase integration (particularly of the contractor) and which may or may not incorporate a project manager but which do not necessarily overcome the polarisation of professional attitudes.

The 1980s saw a shift from the government-sponsored reports of the 1960s and 1970s to initiatives from the private sector, reflecting a shift in the political climate as a more pragmatic position was adopted. Carpenter (1981) was typical of clients, stressing that the industry frequently adopted inappropriate organisation structures and the British Property Federation (1983) came up with its own system to impose on an industry which it felt was not changing itself sufficiently quickly. Government reflected this pragmatism with so-called ‘client guides’ to procurement (Department of Industry 1982; National Economic Development Office 1985) and practical comparisons of different approaches to development with the emphasis on speed of construction (National Economic Development Office 1983, 1987). Nevertheless, Mohsini and Davidson (1992) estimated that 80% of all building projects in the United States were still procured by conventional processes although Bresnen and Haslam’s (1991) work implies that it may be somewhat less at about 70% in the United Kingdom.

Following the spate of reports during the 1970s and 1980s, the process drew breath until the Latham Report (1994), which reinforced the pragmatic tone of the 1980s. Whilst its focus was predominantly on contractual matters and their impact on conflict, payments and cash flow, it nevertheless found room for an important section on project management. The changes which had taken place
since the 1970s were clearly recognised by the report’s comment that ‘there is increasing (if sometimes reluctant) acceptance that Project Management, and a separate discipline of Project Manager, are permanent and growing features of the construction scene.’ The report continued by recognising that the manner by which project management can be provided takes a great many forms which may or may not require someone with the title of project manager. Recommendations were made requiring a clearer definition of the role and duties of project managers. Comments on project management were rather overshadowed by the contractual and other matters but a focus of the working group set up to implement the cost reduction initiative and other matters was on organisational issues to answer such questions as follows: How do you decide what to build? What is the best way to set up a team? The Latham Report began its executive summary by stating that previous reports on the construction industry had either been implemented incompletely or the problems had persisted. Again the report recognised the need for common professional education as did the Phillips Report of 1950 and the Emmerson Report of 1962 but progress over 60 years on has been minimal. Similarly, Barrett et al. (1996) comment that the findings of the Latham Report in respect of project briefing were hardly different from those of Banwell 30 years previously. That the Latham report did not address the fundamental problems of the industry was well expressed by Cox and Townsend (1997) who believed that although well intentioned, the report was flawed, mainly due to the methodology adopted, which relied on consulting vested interests within the industry that were intent on maintaining the status quo.

Subsequently, the Egan Report, *Rethinking Construction* (1998) argued for a radically changed industry with higher margins for contractors, better value for money for clients, improved welfare (particularly safety) and better training. Many of these benefits were seen to be achievable through supply chain management using long-term partnerships. Subsequent experience of these initiatives has not perhaps been as successful as anticipated. The report identified five key drivers for change: ‘committed leadership, focus on the customer, integrated processes and teams, a quality-driven agenda and commitment to people.’

The effort which went into the follow-up to the Egan Report far outstripped anything which had gone before. The Strategic Forum for Construction (SffC) was established in 2001 to take its recommendations forward through the coordination of all the bodies associated with the industry. Whilst the Egan Report was much wider than previous reports, it did not explicitly focus on project management but it is interesting that its four key areas are client engagement, integrating teams and supply chains, people issues and enhancing the value of the product – which comprise the essence of project management. The SffC’s (2002) major publication was *Accelerating Change*, which identified progress since the Egan Report, including innovation, key performance indicators and, most importantly, demonstration projects which ‘provide the opportunity for leading edge organisations from whatever part of construction to bring forward projects that demonstrate innovation and change that can be measured and evaluated’. It noted that over a thousand construction organisations were actively involved in its initiatives – which in itself provides a major integration problem! SffC also set up a number of significant groups to further progress its agenda, including Constructing Excellence, the Construction Clients’ Group and the Sustainability Forum. Subsequently, SffC has focused on leading the
industry’s thinking on a range of issues of major concern to the industry, clients, stakeholders and society at large. Currently, these include procurement and integration of project teams, commitment to people, client leadership, sustainability, design quality, and health and safety. The long-term challenge is for the initiatives to percolate to all levels of the industry rather than remain with the more progressive, usually large, firms.

Such reviews, reports and developments have been valuable in identifying initiatives for improving the construction industry, but they have focused on immediate and practical issues. Underlying many of the challenges and ideas which were identified was the need for a framework for designing organisational structures which would allow project management functions to be clearly identified to reflect the demands of different projects and enable initiatives appropriate to the specific project to be incorporated.

Alongside the increasing recognition of the importance of project management in government reports and from slow beginnings in the 1970s, construction project management research has grown to respectable levels of rigor, scope and volume. Whilst striving to develop its own paradigms, it has also drawn on relevant theories from other disciplines as well as attempted to identify theories of project management, albeit some say not too successfully to date. Nevertheless, a substantial body of research has arisen and spawned a valuable and respected crop of refereed academic journals as the discipline matures. Turner (2010) illustrates the evolution of project management research in terms of its range of topics and methodology employed drawn from the International Journal of Project Management. It could be that the research culture of construction project management may not lie so much in its own theories than in the application of theories from other disciplines to construction project management issues and problems, for example economics, sociology, psychology and management generally.

### 1.3 Management and Organisation

Before discussing project management specifically and particularly organisation structure, it is necessary to have a clear idea of what is meant by management and by organisation. It is hardly surprising that definitions of management have occupied authors of management literature at length when the Shorter Oxford English Dictionary lists 10 meanings of ‘to manage’, ranging from ‘training a horse’ and ‘wielding a weapon’ to ‘controlling the course of affairs by one’s own action.’ The minds of many are also conditioned by its ironical use, which the dictionary quotes as ‘to be so unskilful or unlucky as to do something’. Much of the literature presupposes that the reader has a clear idea of the concepts of management and organisation. Some writers offer a dictionary-style definition, but the operational definitions offered by Cleland and King (1983) continue to provide a useful perspective.

An operational definition is one that identifies a number of observable criteria, which, if satisfied, indicate that what is being defined exists. Cleland and King’s operational definition of management identifies the criteria of ‘organised activity, objectives, relationships among resources, working through others and decisions’. In providing an operational definition of organisation, Cleland
and King had to employ many of the elements used in their management definition. Organisation and management are intrinsically interlinked concepts. Organisation is concerned with the ‘organised activity’ part of their definition of management, and their observable criteria are ‘objectives, some pattern of authority and responsibility between the participants with some non-human elements involved’. Decisions, both routine and strategic, are required from management to make the organisation operate.

A more contemporary definition of organisation is given by Scott and Davis (2007) as ‘social structures created by individuals to support the collaborative pursuit of specified goals’, which has a less rigid feel than an operational definition and transmits a sense of flexibility and concern for people in organisations. Management definitions continue to share the elements of definitions of organisation but McAuley et al. (2007) make the point that management theorists define management in such a way as to place management at centre stage in activating all forms of organisation and continue by questioning ‘the assumption that management, as a hierarchy of authority and power, is indeed a technically necessary feature of all cooperative endeavours’. Whilst an interesting philosophical point, it is difficult to envisage construction projects being constructed without a pattern of authority and timely decision-making. Managers gain their power and hence authority through delegation from those who own the factors of production – capital, land and machinery – and have ‘a socially defensible right to make a decision on how to use these resources’ (Stinchcombe 1983). The nature and strength of authority can vary significantly but nevertheless is what distinguishes management from organisation.

McAuley et al. (2007) focus explicitly on the specific goals or definite purposes which organisations are expected to have, for which organisation theory is expected to contribute to their attainment. Drawing on Silverman (1970), they question whether organisations can have goals in the same way as individuals do as this implies that all members of the organisation sign up for the collective goal. They claim that it is not possible to presume the existence of such a consensus. Rather they see members of organisations having different goals regarding their involvement with the particular organisation. Construction project organisations can be expected to have clearer goals than many other types of organisation as the building to be achieved is usually specified in the early stages of the process of project management. Although modification of the brief for the project may take place during the project management process, it is rare for such changes to be fundamental to the original intentions. The diversity of goals referred to by McAuley et al. (2007) is much more likely to be encountered among the members of the construction client’s organisation.

Although management and organisation are closely interlinked concepts, it is interesting to note that management is more frequently defined in the literature than organisation. Yet it was said many years ago (Likert 1961) that ‘how best to organise the efforts of individuals to achieve desired objectives has been one of the world’s most important, difficult and controversial problems’ and still holds today. It may be said that, in industries more homogeneous than the construction industry, the distinction between management and organisation is sufficient, but an especially sharp focus on the organisation of the many diverse contributors to construction projects is necessary if the successful management of projects is to be achieved.
For the purpose of accomplishing a construction project, an organisation can be said to be the pattern of interrelationships, authority and responsibility that is established between the contributors to achieve the construction client's objectives. Management is the dynamic input that makes the organisation work. When this takes place, the organisation ceases to be static and works and adapts to meet the objectives laid down for it. Management is therefore concerned with setting, monitoring and adapting as necessary the objectives of the project organisation as transmitted by the client (which includes stakeholders) and with making or advising on the decisions to be made in order to reach the client's objectives. This is achieved by working through the organisation set up for this purpose, which is particularly difficult for construction projects owing to the temporary nature of most project organisations. In many cases, members of the organisation are part-time, as they are also involved in other projects and are normally seconded from their parent company.

The contributors to the project act through the organisation that has been established to integrate their work, and they produce information that allows the managers of the project to make the decisions that will keep the process going. The effectiveness of the organisation structure is therefore fundamental to the quality both of the information on which decisions will be taken and of the decision-making process itself.

### 1.4 Definition of Construction Project Management

General management definitions require amplifying before they can be used for defining construction project management, which can be said to be as follows:

The planning, co-ordination and control of a project from conception to completion (including commissioning) on behalf of a client, requiring the identification of the client's objectives in terms of utility, function, quality, time and cost; the establishment of relationships between resources; integrating, monitoring and controlling the contributors to the project and their output; and evaluating and selecting alternatives in pursuit of the client's satisfaction with the project outcome.

In this context, resources is a general term, which includes materials, equipment, funds and, in particular, people. A fault with many definitions of project management is that they do not make a specific reference to managing people to achieve a project. Although it can be implied that projects can only be achieved by working through others, nevertheless, it is important that definitions make explicit reference to this fundamental aspect of project management.

The implementation of this definition could take many forms in practice, depending on the nature of the project and the circumstances in which it is carried out but no matter what organisation structure is adopted, if project management is taking place, the activities within the definition should be capable of being identified. The elements of project management have not changed fundamentally since this definition was devised in the early 1980s as illustrated by the definitions used by the British Standards Institution (2000) and the Chartered Institute of Building (2002).
In this context, it is important that the objectives of project management are not drawn too narrowly in terms of only time and cost. Interestingly, Munns and Bjeirmi (1996) attempted to draw a distinction between the project on one hand and project management on the other. They argue that project success is about client satisfaction with the longer-term performance of the project fulfilling its purpose, and not short-term time and cost objectives that they believe are often perceived as the objectives of project management. The latter takes a narrow view of project management. The objectives must include client satisfaction, which should incorporate the client’s view of its need to satisfy stakeholders, in all aspects of project success that encompass the function and utility of the project, which should be broadly defined and long-term.

1.5 Objectives and Decisions

Objectives and decisions have particular significance for construction project management. The objectives of the project management process are those defined by the client, and the role of project management is to ensure that the project organisation works to achieve the client’s objectives. Similarly, decisions taken during the process should be taken with the sole purpose of achieving the client’s objectives.

As referred to earlier, the term ‘stakeholders’ has been used over recent years as a supplement or alternative to ‘client’ to demonstrate that there can be many parties with a formal or informal interest in a project. This book will continue to use the term ‘client’ to indicate the organisation (of which there may be more than one) with the authority to take decisions that the project team must follow and which incorporates ‘stakeholders’.

Because a large number of organisationally independent firms are usually involved in construction projects and second their staff on a part-time basis, their integration and orientation to the client’s objectives are major functions of project management. Thus, objectives need to be clearly stated and the head of the project management team will have to extract them from the client, state them clearly and transmit them equally clearly to the contributors to the project.

It is important that any adaption of the objectives that may subsequently occur is treated similarly. It is natural to be greatly concerned with the original objectives, but adoptions are not always given the same attention, leading to dissatisfaction with the completed project on the part of the client.

As contributors will normally be involved in a number of projects at the same time, conflicting demands upon their time and attention are always likely to occur. The project organisation must be designed and managed to resolve such conflict in the interest of its client so that it does not detract from the achievement of the client’s objectives.

1.6 The Project Management Process and the Project Manager

The use of the title ‘project manager’ in the construction industry has deflected attention away from consideration of the process of project management. It is necessary at this point to distinguish between the title and the process.
A common reaction seems to be that if there is someone called a project manager, then all project management problems will instantly be solved. But the project management process will take place irrespective of the titles of the people in the process. The industry needs to be concerned with identifying and studying the process of managing construction projects and with structuring its organisations and implementing techniques and procedures that make the process more effective. It may well be that the designation of a suitable individual with the title of project manager will assist in this, but it is not likely to be an instant and universal solution.

The approach should be to identify the process to be undertaken for the achievement of the specific objectives of the client, the conditions in which it is to be carried out and the people available for the project. As a result of this analysis, the organisation structure should be designed to suit the particular project. The nature of the project should establish the roles of the contributors and ascertain whether or not a role emerges that requires the title of project manager as a reflection of the project's needs. Such an approach would focus attention upon the process of project management with the result that effort should be put into making it more effective rather than into a preoccupation with titles.

The title project manager should have a reserved meaning in the construction industry. Projects are executed for clients and as the title means managing the project as a whole it should refer to managing the project for the client; that is, the specific and unwavering objective of the project manager must be achievement of the client's objectives. The project manager will therefore seek to resolve conflict in the process in the interests of the client. This implies that ideally the project manager should be a member of the client's organisation.

One step removed from this, and more practically, the project manager could be acting as a professional consultant without an entrepreneurial interest in the project. Even in this latter case, it is possible to conceive a situation in which project managers might have difficulty in resolving conflict solely for the benefit of the client if, for instance, they are handling a number of projects that generate conflicting demands on their time and attention. Any further removal of the project manager from direct responsibility to the client makes the title difficult if not impossible to justify.

The title does not always have this reserved meaning in practice and this leads to confusion. Other titles are available which can be used to imply the orientation of the particular management activities undertaken. For instance, construction manager, contract manager and design manager are roles that are often designated project manager. The activities implied by such titles do not necessarily have the client's interest as their main concern. It must be added that they do not, of course, deny satisfying client objectives as one of their objectives. The increasing use of design-and-build structures confuses the issue somewhat as a design-and-build company will usually designate its own person as project manager, but this role is distinctly different from the client's project manager (either in-house or in a consultancy role) as its focus is not solely on the client's objectives.

To complete the array of management activities in the construction industry, it should be recognised that general management of the contributing firms will also be taking place, the objective of such activities being the effectiveness of the firm.
The title project manager is, of course, not reserved for the construction industry. It is a title used increasingly in many industries as the style of their organisation structures veer towards project management. A further issue in the construction industry that is probably unanswerable is which profession provides members best suited to be project managers? A paper by Hodgson et al. (2011) touches on both these issues when considering the experience of engineers as project managers. The sample incorporates project managers from local government, defence, construction, scientific research and IT. Whilst project managers from each industry are not considered separately, it seems that civil engineers from construction who progress to project managers on complex infrastructure projects benefit greatly from being civil engineers by training. However, project managers in building, rather than civil engineering aspect of the construction industry may be drawn from any of the professions associated with construction but perhaps with the exception of civil engineers. The complexity of the breadth of the issues for project managers over the range of industries in which they may work is summed up in the paper's finding of ‘the existence of a gap between expectations and reality for technical specialists who take on project management roles, a gap which can be partly explained in the light of a fundamental tension between the technical and managerial functions’.

1.7 Projects, Firms and Clients

**Conflicting Objectives**

The work of firms in the construction industry and its professions present two types of management issue: the problem of managing firms and that of managing projects. This leads to a rather complex matrix management structure, shown in a much simplified form for a conventional arrangement of contributors in Figure 1.1. This diagram is greatly simplified because it implies that the three projects are each being undertaken by the same professional practices, general contractor and subcontractors. In practice, of course, this is rarely the case. Normally, there will be different mixes of professional practices, general contractors and subcontractors on each project. Even if the private practices are the same, by using competitive tendering it is very unlikely that the general contractor and subcontractors will remain the same. Such a lack of consistency of contributors makes it extremely difficult to improve the effectiveness of the project management process. Not only do firms have to get used to each other at both a corporate and an individual level but they are also unlikely to invest much time and money in making the process more effective when they know that any temporary management structure that they establish may only occasionally be used in a similar form again. Relational contracting initiatives have gone some way to overcoming such problems for clients with multiple projects, but a not insignificant proportion of projects still takes the conventional form or something similar.

Donaldson (2001) classifies matrix structures in three types: functional–project, functional–area and product–area, each of the two elements representing one dimension of the matrix. He raises the question of whether matrix
structures should be considered to be organic or bureaucratic structures. He argues that they are essentially a more complex form of hierarchy having two managers, with a potential for conflict at each intersection of the matrix and are hierarchical and so compatible with a mechanistic structure. However, he excludes the functional–project matrix (akin to construction) from this conclusion to allow interaction between specialists and create conditions for problem solving, which requires an organic structure with a culture that encourages openness.

Construction projects, whether conventional or relational, are usually undertaken by an amalgam of firms, which change from project to project. The firms involved in each project are independent companies, which are organisationally interdependent in terms of the project. This situation creates a potential for conflict between the needs of each firm and of each project. Each firm has objectives which are expressed in terms concerned with the efficiency of the firm, such as

- Increasing productivity
- Improving service
- Maintaining existing clients
- Attracting new business
The major purpose is to improve effectiveness and hence service and profits. Professional practices would claim to be less entrepreneurial than contracting organisations, but nevertheless conflicts between the needs of individual firms and the needs of projects will still arise. For instance, what does a firm do if there is a choice to be made because of limited resources between progressing an urgent matter for an existing client and undertaking a piece of work that could clinch a commission with a new client? Similarly, what would a contractor do if faced with a choice between keeping a piece of equipment on site to be used to keep a project on programme and removing it to another site in order to increase the profit on the second site, knowing that liquidated damages are unlikely to be claimed on the first site?

The objectives of project management, which ideally should also be the objectives of the firms involved in the project are, as has been said, the objectives of the client. These will relate directly to the project and will be

- Functional satisfaction
- Aesthetic satisfaction
- Completion on time
- Completion within budget
- Value for money

Where, then, does the responsibility lie for ensuring that the project’s objectives are met? The professional practices, particularly architects and civil engineers in a conventional arrangement, would say that it rests with them. But who, then, is to resolve any conflicts that may occur in a manner which is to the benefit of the particular project? If the practices are to do it, can they be sufficiently unbiased to resolve conflict to the benefit of the project to the extent to which the client may require?

The matrix structure using independent firms seems to need the responsibility for project management to rest in a firm or an individual who is independent of the potential conflicts within the contributing firms. But may not such a firm also be faced with similar conflicts if dealing with a stream of projects?

Ideally, it seems that project management should be exercised by the client organisation itself, and this reflects the need for clients to be very close to the organisation and implementation of their projects. However, many clients do not have the expertise to manage their own projects. This, therefore, is the dilemma for clients and for project management. Clients should be concerned to ensure that the design of organisation structures for their projects recognises and seeks to overcome such potential conflicts.

These issues raise the question as to whether the construction industry is unique. There have been a number of initiatives to transfer techniques from other industries, with mixed success, for example lean construction, prime contracting and requirements management (Fernie et al. 2003). As Fernie et al. argue in relation to requirement management, practices are embedded in context. The structural differences between industrial sectors mean that practices have limited meaning when transferred. However, the construction industry is not unique in terms of its organisational problems except perhaps that these pervade all levels of construction activity and in many countries are firmly
rooted in the historic development of the industry and its professions. Organisation theory, being generic, as opposed to techniques, is relevant to analysing these issues.

Interestingly, recognition of the project management process as a suitable subject for formal study and research emerged from complex projects outside the construction industry (Morris 1994), for example in connection with the defence/aerospace programme in the United States and in other industries facing complex demands that required inputs from a range of independent firms, yet the situation they faced has been present in construction certainly since the nineteenth century.

It has taken the complexity and constraints of today’s world, together with initiatives from outside the industry, to focus attention upon the way projects are managed as a possible means of finding solutions to some of the problems the industry faces. This reflects much of what Marian Bowley (1966) deduced about the inertia within the building industry and professions which stifled innovation.

**Organisation Patterns**

Conventionally, the patterns which emerged for construction project organisations were essentially determined by the arrangement of independent professional firms and contractors selected in competition. However, whilst such conventional arrangements continue, a wide range of organisation patterns has arisen through the development of, for example, interdisciplinary group professional practices, design-and-build companies and joint ventures for overseas contracts all of which seek to overcome some of the problems associated with the differentiation between professional firms, contractors and other contributors to projects arising from conventional arrangements. In particular, new organisational forms are generated by the way in which the general contractor and subcontractors are selected. A wide range of alternatives are available, for instance, design-and-build, two-stage tendering and negotiated contracts. As a result, it becomes necessary to determine whether any proposed contract designed to deal with these relationships generates the organisational form most likely to achieve the client objectives. It is accepted that there is no one ‘best’ form of contract for construction projects (Nahapiet & Nahapiet 1985). One then has to add what is probably the most significant variable: the vast range of client types served by the industry together with other initiatives such as partnering (a behavioural initiative) aimed at developing a closer working relationship between client and contractor.

**Variety of Clients**

Clients vary in many ways. Of particular importance is the variety of objectives that clients seek to satisfy. Differences in this respect are particularly marked between private and public sector clients, and overseas and multinational clients may have objectives rarely encountered in home markets.

The variety of objectives is compounded by the range of uncertainty of clients’ objectives. The construction industry and its professions have to be skilled at translating such variability in a way which enables them to
produce projects that satisfy their clients. They have to deal directly with their clients and in order to do this, and obtain and interpret instructions properly, they need to understand how their clients’ organisations operate as the organisation structures used by clients vary considerably to reflect the needs of clients’ major activities. As everyone, either individually or corporately, is a potential client for construction work, the construction industry and its professions could be called upon to work with every or any possible organisation configuration. The industry and its professions need to understand how organisations work in order to organise themselves and also understand how their clients’ organisations work, so that they may be in the most advantageous position to interpret and implement their clients’ objectives.

The demands that both private and public clients place upon the construction process are frequently complex and uncertain. This simply reflects the complexity and uncertainty of the modern world, as demonstrated by contemporary economic, social and environmental issues. The construction industry and its professions are themselves also subjected directly to such forces.

The professions and industry are now more readily developing approaches to the design of organisation structures that are tailored to satisfying specific client objectives and take advantage of the range of temporary management structures available. What is necessary is a framework for designing the most appropriate structure.

### 1.8 The Contribution of Organisation Structure

The concept of organisation structures has been said by Hinings (2003) to be at the heart of organisational studies. He believes structure is important because it has been historically central to the development of organisation theory, continues to be of importance to existing and new organisational forms and is a prime analytical construct for organisational theorists because it is central to the thinking of managers. There are many factors other than organisation structure that have a significant bearing upon the performance of an organisation. However, organisation structure is a particularly important aspect as, if properly designed, it allows the other aspects to function effectively.

This is not to say that, if an organisation is inappropriately designed, it will not perform adequately, as people have the ability to construct informal organisation structures that circumvent the formal structure often to the benefit of performance. However, a strong informal structure can work against organisation coordination and control. The ideal is when the organisation is sufficiently well-designed that it does not generate an informal structure. Such an outcome would mean that the organisation is designed to meet its specific objectives and that the participating members would have confirmed that, in their view, this is in fact the case.

An appropriately designed organisation structure for a project will provide the framework within which the other factors that influence the effectiveness of the project management process have the best chance of maximum performance in the interests of achieving a client's objectives. For the purpose of
construction project management, the major internal factors influencing the effectiveness of the management process can be considered to be

- Behaviour
- Techniques and technology
- Decision-making
- Organisation structure

These aspects are interrelated and interdependent, as illustrated in Figure 1.2. The project management process is also subject to external influences. These comprise all elements outside the process which, if they change, demand a response from the project management process if it is to remain effective. Examples are economic forces, which may affect the client and modify the objectives for the project, and legal forces, which may require changes to the design, for example revised building regulations.

**Behaviour**

The behavioural factor consists of the characteristics of the individual members of the organisation as reflected in their motivation, reaction to status and role
relationships and their personal goals and values (Walker 2011). It therefore determines the attitude they have to their work on the project and to the work of others. Attitudes are significantly affected by external influences (e.g. the views of society) in addition to being influenced by the other aspects of the management process; for example, Loosemore (1994) finds that high reciprocal interdependency of tasks frequently found on construction projects forces people to find solutions to problems. Behavioural responses have particular significance for construction project management because of the sentience of the various professions and skills involved, many of which have strong allegiances and view projects from very different positions, as illustrated in Figure 1.3. It is a factor that can have a significant impact on the effectiveness of the project management process.

Figure 1.3 Perspectives of the contributors (original idea and sketches by Dave Taylor).
Techniques and Technology

Techniques and technology are the tools used by members of the organisation to produce the building or other construction work and include not only the hardware required to undertaking the work of the organisation but also the skills and knowledge of the members. The quality of the tools they use is determined by the knowledge the project team have of the techniques and technologies available and their skill in using them. The interdependency of the organisation structure and the techniques and technology used is based upon the need for the organisation to be structured in such a way that the appropriate techniques and technologies are drawn upon and used at the correct time in the process of designing and constructing. As a corollary, the techniques and technologies adopted may demand a certain organisation and integration of the contributors to make their use effective. The techniques employed and the way in which they are put together by the project management process are fundamental to achieving clients’ objectives. They encompass evaluation, appraisal and control methods, contractual techniques and approaches to design, as well as the techniques of constructing the project and innovation. Particularly important for construction projects is the project information facility employed and how this relates to the organisation structure.

Scott (1992) believes that three dimensions of technology – complexity, uncertainty and interdependency – are most important in explaining differences in structural characteristics of organisations. Technical complexity leads to structural complexity and increased professionalisation, uncertainty leads to lower formalisation and decentralisation of decision-making and complexity and uncertainty to greater interdependency needing higher levels of coordination. From this analysis, the links of technology to organisation structure and decision-making are clear to see, particularly in construction.

Decision-Making

Although the quality of decision-making is vital for all organisations, it acquires special status on construction projects. The complexity of projects is reflected by the large number of specialists who contribute to the decision-making process. It is therefore closely related to the organisation structure, which determines how people work together to produce the output that forms the basis on which decisions are made.

In moving towards the completed building, the process is characterised by a series of ‘pinch points’ through which it must pass if it is to make progress. At each of the points, a decision has to be made which could, at one extreme, include the option to abort the project. The process of making these decisions will be managed by the project management process as a whole and will be based on output generated by the contributors working within the organisation structure using techniques and technologies. The client and managing executive will take many of these decisions based on the advice of the specialist contributors. The significance of decision-making is that it should be interrelated with the organisation structure in such a way that advice is received by the decision-maker from the appropriate contributors at the appropriate time.
**Organisation Structure**

The organisation structure of a particular construction project is a subset of the project's management process. It structures the relationships of the members of the organisation and hence influences their responses to the demands placed on them. It establishes the way in which advice is generated for decision-making and the use of techniques and technology in the process. It should be designed to allow these factors to be integrated.

The managing executive of the project should be responsible for designing the organisation structure and should provide the integrating activities that weld the parts into a unified whole. The managing executive then provides the dynamism required to make the whole process seek to achieve the client's objectives.

1.9 **Organisation Theory and Project Organisations**

Organisation theory recognises that professional organisations are distinctive. As Scott (1992) states,

Certainly the most elaborate and intricate organisational arrangements yet devised for coping with high orders of complexity and uncertainty in production systems are to be found in the professional organisation.

However, he continues by focusing on what he terms autonomous professional organisations and heteronomous professional organisations. The former are those in which the professionals have responsibility for their own goals and the establishment and maintenance of their performance standards. Examples are independent design, legal and accountancy firms. The heteronomous types are when the professional staff are subordinated to administrative staff and have relatively little autonomy. Public agencies fall into this category, such as schools and welfare agencies. A grey area also exists in fields such as medical staff in public hospitals and academics in universities when a high level of autonomy but not absolute autonomy is frequently the case.

In the 1990s, Scott saw project teams as a one of a new generation of organisational forms which also included matrix structures and which departed from traditional hierarchical arrangements to utilise lateral relationships. What is significant is that the types of structure which have been used as a matter of course in the construction field were seen as the ‘new generation of organisational forms’ by organisation theorists. In a later edition, Scott (1998) states the following:

The ‘new’ organisation is more closely attuned and interdependent with its suppliers and buyers; it is less likely to have a large body of permanent full-time employees, and much of its structure is shaped and the logics controlling its operation are provided by experts and specialists imported from outside who have less stake in the welfare of their specific employer . . . newer models recognise the reality of interdependences and stress the importance of developing appropriate alliances and alignments (see Ancona et al. 1996).
Organisation theory based on general organisation forms continued to move towards forms both conventional in the construction field and more recently developed such as temporary project teams (conventional) and partnering (more recently). Whilst elements of general organisation and management theory are relevant and useful to project management, that which is so needs to be carefully distilled and developed before it is able to provide insights which contribute to making project organisations more effective. The distinctions were highlighted by Thompson (1991):

The temporary nature of the project team and the need to define and achieve specific project objectives against a demanding timescale, together with the high level of risk and expenditure encountered on many projects, will demand a style of project management that is likely to be more dynamic than that of corporate management.

Against this backcloth, it may seem surprising that construction project organisations have been able to design and construct projects reasonably successfully for hundreds of years and particularly so in the more unstable environment of this century and the last. But construct them they have; nevertheless, this does not mean that they cannot do so more effectively. The way forward is to identify those aspects of organisational theory which have relevance to the organisation and management of construction projects and find ways to apply them to projects to increase the effectiveness of project management. The testing of aspects of organisational theory in a construction project management context, but more particularly from experience in practice and from original thinking specifically about project organisation, is a necessary basis for increased effectiveness and will enrich our understanding of how to design and construct more effectively to the greater satisfaction of clients.

1.10 Relevance of Systems Theory

This book is primarily concerned with understanding the elements which lead to the design of effective organisation structures for construction projects. A significant inhibition to progress has been the lack of a fundamental framework of organisation theory relating to construction projects against which experience of the various organisational initiatives can be measured and compared.

Systems theory provided the opportunity to contribute to such a framework. *General systems theory* (GST) originated in the biological sciences, but its originator (Von Bertalanffy 1969) has acknowledged its general applicability, which he considers encompasses business organisations. It has been usefully applied to organisational problems in industries other than the construction industry.

The attraction of systems theory as a medium for identifying a conceptual framework for the management of the construction process lies in the basic premise that a system is an organised or complex whole: an assemblage or a combination of things or parts forming a complex or unitary whole, which is greater than the simple sum of the parts. The systems approach stresses the contribution of the interrelationships of the parts of the system and the system's
adaption to its environment in achieving its objective. A major outcome of the application of systems theory has been the acceptance that there is no universal panacea for management problems. Recognition of this by management theorists and researchers has led Jackson (2000) to dismiss management 'gurus' who claim to have unequivocal solutions to all management issues in all circumstances. As he says, ‘Those who propagate management fads often appear to know the answers before they actually do the research, which amounts to little more than a self-fulfilling prophecy’. He quotes Lorsch’s (1979) criticism of human relations theory in such terms and points out that Lorsch’s strictures have been echoed, almost to the letter, by Harvey-Jones (1993):

The difficulty is that there can never be any single correct solution to any management problem, or any all-embracing system which will carry one through a particular situation or period of time . . . choosing the particular ideas which are most appropriate for the position and time in which he finds himself.

The systems approach to organisation design does not ignore the other major factors that influence the effectiveness of the project management process. Rather the systems approach provides the core to which all other elements relate. Such elements include the behavioural/psychological approaches to management particularly, relating to motivation, organisation culture, strategic management, decision-making techniques and many other specific aspects of management together with transaction cost economics, all of which make significant contributions to an understanding of the management process and have many publications devoted to them.

Very early recognition of the value of the application of systems concepts to the organisation design of the construction process was demonstrated by Napier, Handler and Morris. Napier (1970) attempted to gain an understanding of the problems of the Swedish building industry as a whole as a basis for the design of systems for the future. Handler (1970) was principally concerned with the building as a system. This concept was developed by reference to GST, by drawing an analogy between a living organism and a building. Peter Morris (1972) developed an approach to studying integration of the participants at the design–construction interface of construction projects. Morris’s work supported the systems approach in that he found that organisation theory, especially when employed in the context of a systems framework, could be used to describe and explain the nature of the management process of construction projects.

Later, yet still early work of significance was undertaken by, for example, Ireland (1985), Rowlinson (1988) and Hughes (1989). All were underpinned by a systems perspective applied to different issues of importance to the construction industry. Ireland used the systems model of organisations as a general paradigm and from that base investigated the relationship between the use of particular managerial actions and the achievement of project objectives. Rowlinson attempted to indicate some rational basis for the choice of procurement form for the management of construction projects by identifying those factors which significantly affect project performance. This was done with particular reference to the distinction between design-and-build and conventional procurement forms. Hughes adapted the model described in this book to
analyse the management of public sector projects to identify the elements of the project management process which contributed to or detracted from their success. Subsequently, the systems approach has become accepted as a powerful tool for analysing construction project management (cf. Blockley & Godfrey 2000; Fewings 2005; White & Fortune 2012).

These studies illustrate the value of the application of systems theory to the building process. Each study took a different perspective but employed the same basic concepts. The fundamental premise of systems theory stresses interrelationships and is as concerned with the links between the parts of the system as with the parts themselves. The problem of how to make the links work effectively is essentially the problem of project management. In order to apply these ideas to the construction process to the greatest benefit, it is necessary to take as broad a perspective of the process as possible from conception of the project to completion and beyond.