

## CONTENTS

|                                         |    |
|-----------------------------------------|----|
| Definitions of Project Management       | 18 |
| Characteristics of Project Management   | 19 |
| Adding Value                            | 20 |
| Scope of project management             | 20 |
| The Project Life Cycle                  | 20 |
| Inception/Strategic Definition/Strategy | 26 |
| Stage Process Outcome                   | 26 |
| Client /Owner                           | 26 |
| Client Engagement Team                  | 27 |
| Project sponsor                         | 28 |
| The Project Manager                     | 28 |
| Project Manager Duties                  | 29 |
| Environmental Mandate                   | 32 |
| BIM Mandate                             | 32 |
| Exercises                               | 33 |

## Definitions of Project Management

There are many definitions in existence for the term 'Project Management'. The CIOB, uses the following definition:

***The overall planning, coordination and control of a project from inception to completion aimed at meeting a client's requirements in order to produce a functionally viable and sustainable project that will be completed safely, on time, within authorised cost and to the required quality standards.***

Figure 1.5 summarises a number of definitions of project management, as practiced by a selection of leading organisations involved in project management within the construction and building industry in UK.

| Organisation                                                                   | Definition of project management                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Chartered Institute of Building                                                | The overall planning, coordination and control of a project from inception to completion aimed at meeting a client's requirements in order to produce a functionally viable project that will be completed safely, on time, within authorised cost and to the required quality standards.                                                                                                                                                                                                                                      |
| Association for Project Management                                             | The application of processes, methods, knowledge, skills and experience to achieve the project objectives. <sup>1</sup>                                                                                                                                                                                                                                                                                                                                                                                                        |
| British Standards 6079:2010                                                    | A unique set of coordinated activities, with definite starting and finishing points, undertaken by an individual or organisation to meet specific objectives within defined schedule, cost and performance parameters.                                                                                                                                                                                                                                                                                                         |
| Office of Government Commerce (Department of Business, Innovation, and skills) | The planning, monitoring and control of all aspects of the project and the motivation of all those involved in it to achieve the project objectives on time and to the specified cost, quality and performance. <sup>2</sup>                                                                                                                                                                                                                                                                                                   |
| International Organization for Standardization 21500:2012                      | Project management is the application of methods, tools, techniques and competencies to a project. Project management includes the integration of the various phases of the project lifecycle.                                                                                                                                                                                                                                                                                                                                 |
| International Project Management Association <sup>3</sup> IPMA                 | Project management (PM) is the planning, organising, monitoring and controlling of all aspects of a project and the management and leadership of all involved to achieve the project objectives safely and within agreed criteria for time, cost, scope and performance/quality. It is the totality of coordination and leadership tasks, organisation, techniques and measures for a project. It is crucial to optimise the parameters of time, cost and risk with other requirements and to organise the project accordingly |
| Project Management Institute <sup>4</sup> PMI                                  | Project management is the application of knowledge, skills and techniques to execute projects effectively and efficiently. It is a strategic competency for organisations, enabling them to tie project results to business goals – and thus, better compete in their markets.                                                                                                                                                                                                                                                 |

Figure 1.5 Definitions of Project Management

## Characteristics of construction projects

Construction projects have inherent features that make them highly complicated enterprises. These features are characterised by high levels of complexity, uncertainty and uniqueness and include

- Complexity created by the fragmentation of the organisational mechanism by which most projects are delivered. Usually the project delivery team is external to the client organisation, there is a separation between the designers and the constructors and the requirement for a wide range of specialist knowledge and skills demands the involvement of a large number of consultants, contractors, suppliers and statutory bodies.
- Complexity of the technology involved in the construction of modern buildings.
- Logistical complexity created by the locational aspects of projects –the site being a fixed location means that everything else must be taken to it. It is likely logistical complexity will be increased in a highly urbanised country where the pressure on land means the building footprint is likely to be the same as the site area, leaving minimal working space.

- Uncertainty created by exposure to the extremes of the weather.
- Uniqueness of each project; the project organisation and the participants vary, site conditions are different, technology adopted for the building varies, external influences on the project will be different and client constraints will be different.
- Uncertainty caused by the time necessary for the project life cycle. The longer the period of time, the greater the opportunity for the project to be impacted by changing external circumstances, such as economic conditions, or by changing client requirements.

Further pressures are created by a client needing to commit to key criteria such as the project duration and cost budget at an early stage, often before the full implications of what the project actually is about and how it is to be implemented have been developed in detail.

Most participants to the project are involved because they are offering a service or product as part of their business activity. It is usual practice for this involvement to be a formal contractual agreement with an agreed fixed, lump sum price based on a definition of the service or product required. Throughout their contribution to the project, participants are therefore balancing protecting their commercial position with working towards helping to achieve the overall project objectives. This relationship is not without difficulties and does not always work to the best advantage of the client or the project.

### **Characteristics of construction project management**

Construction projects are intricate, resource consuming and often complex activities. The development and delivery of a project typically consists of several phases, sometimes over lapped but always linked, requiring a wide variety of skills and specialised services to balance the key project constraints (Figure 1.6). In progressing from initial feasibility to completion and occupation, a typical construction project passes through successive somewhat distinct stages that necessitate input from such asynchronous areas such as financial institutions, regulatory and statutory organisations, members of the public, engineers, planners, architects, specialist designers, cost engineers, building surveyors, lawyers, insurance companies, constructors, suppliers, tradesmen and cost managers.

During the construction stage itself, a project of relatively simple design and methodology involves a wide range of skills, materials and a plethora of different but often sequential activities and tasks that must follow a predetermined order that constitutes a complicated and sensitive pattern of individual criteria and restrictive sequential relationships.

The Construction Industry Council (CIC) suggests that the primary purpose of project management is to add significant and specific value to the process of delivering construction projects. This is achieved by the systematic application of a set of generic project-orientated management principles throughout the life of a project. Some of these techniques have been tailored to the sector requirements unique to the construction industry.

The function of project management is applicable to all projects. However, on smaller or less complex projects, the role may well be combined with another discipline, for example, leader of the design team. The value added to the project by project management is unique: no other process or method can add similar value, either qualitatively or quantitatively.

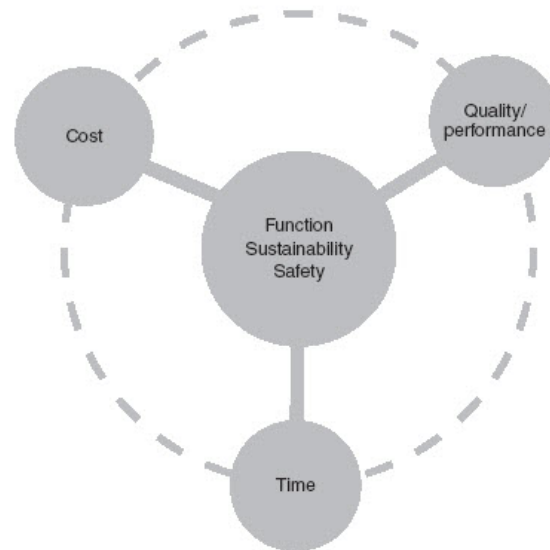


*Figure 1.6 Key Project Constraints*

### **Adding value**

The raising of standards should lead significantly to the adding of value. Greater awareness can result in better design, improved methods and processes, new material choices, less waste, decreases in transportation costs and ultimately more efficient buildings, all of which can bring added value to the whole development process.

### **Scope of project management**

Construction and development projects involve the coordinated actions of many different professionals and specialists to achieve defined objectives. The task of project management is to bring the professionals and specialists into the project team at the right time to enable them to make their best possible contribution, efficiently. Professionals and specialists bring knowledge and experience that contributes to decisions, which are embodied in the project information. The different bodies of knowledge and experience all have the potential to make important contributions to decisions at every stage of projects. In construction and development projects, there are far too many professionals and specialists involved for it to be practical to bring them all together at every stage. This creates a dilemma because ignoring key bodies of knowledge and experience at any stage may lead to major problems and additional costs for everyone.

The practical way to resolve this dilemma is to carefully structure the way the professionals and specialists bring their knowledge and experience into the project team.

### **Project lifecycle**

The different stages of the project lifecycle as identified across the industry have been summarised and compared in Figure 1.7.

In many projects, there will be a body of knowledge and experience in the client organisation which has to be tapped into at the right time and combined with the professional and specialists' expertise. Each stage in the

| Code of Practice for Project Management | Royal Institute of British Architects (RIBA) Plan of Work 2013 | BIM Digital Plan of Work 2013 | BS 6079-1:2010 | ISO 21500:2012 |
|-----------------------------------------|----------------------------------------------------------------|-------------------------------|----------------|----------------|
| 1 Inception                             | 0 Strategic definition                                         | 1 Strategy                    | 1 Conception   | 1 Initiating   |
| 2 Feasibility                           | 1 Preparation and brief                                        | 2 Brief                       | 2 Feasibility  | 2 Planning     |
| 3 Strategy                              | 2 Concept design                                               | 3 Concept<br>4 Definition     | 3 Realisation  |                |
| 4 Pre-construction                      | 3 Developed design<br>4 Technical design                       | 5 Design                      |                | 3 Implementing |
| 5 Construction                          | 5 Construction                                                 | 6 Build & commission          |                |                |
| 6 Testing and commissioning             |                                                                |                               |                |                |
| 7 Completion, handover and operation    | 6 Handover & close out                                         | 7 Handover & close out        | 4 Operation    | 4 Controlling  |
| 8 Post-completion review and in use     | 7 In use                                                       | 8 Operation & end of life     | 5 Termination  | 5 Closing      |

Figure 1.7 Comparison of descriptors of stages of work by different institutions

project process is dominated by the broad body of knowledge and experience that is reflected in the stage name. As described earlier, essential features of that knowledge and experience need to be taken into account in earlier stages if the best overall outcome should be achieved. The way the professionals and specialists who own that knowledge and experience are brought into the project team at these earlier stages is one issue that needs to be decided during the strategy stage.

The results of each stage influence later stages, and it may be necessary to involve the professionals and specialists who undertook earlier stages to explain or review their decisions. Again, the way the professionals and specialists are employed should be decided in principle during the strategy stage.

Each stage relates to specific key decisions (see Figure 1.8). Consequently, many project teams hold a key decision meeting at the end of each stage to confirm that the necessary actions and decisions have been taken and the project can therefore begin the next stage. There is a virtue in producing a consolidated document at the end of each stage that is approved by the client before proceeding to the next stage. This acts as a reference mark as well as acting as a vehicle for widespread ownership of the steps that have been taken.

Having considered the social, economic and environmental issues, projects begin with the inception stage which starts with the business decisions by the client that suggest a new construction or development project may be required. Essentially, the inception stage consists of commissioning a project manager to undertake the next stage which is to test the feasibility of the project. The feasibility stage is a crucial stage in which all kinds of professionals and specialists may be required to bring many kinds of knowledge and experience into a broad ranging evaluation of feasibility.

It establishes the broad objectives and an approach to sustainability for the project, and so exerts an influence throughout subsequent stages.

The next stage is the strategy stage which begins when the project manager is commissioned to lead the project team to undertake the project. This stage requires the project's objectives, an overall strategy and procedures in place to manage the sustainability and environmental issues, and the selection of key team members to be considered in a highly interactive manner. It draws on many different bodies of knowledge and experience and is crucial in determining the success of the project. In addition to selecting an overall strategy and key team members to achieve the project's objectives, it determines the overall procurement approach and sets up the control systems that guide the project through to the final post-completion review and project close-out report stage. In particular, the strategy stage establishes the objectives for the control systems.

These deal with much more than quality, time and cost. They provide agreed means of controlling value from the client's point of view, monitoring time and financial models that influence the project's success, managing risk, making decisions, holding meetings, maintaining the project's information systems and all the other control systems necessary for the project to be undertaken efficiently.

At the completion of the strategy stage, everything is in place for the pre-construction stage. This is when the design is developed and the principal decisions are made concerning time, quality and cost management. This stage also includes statutory approvals and consents, considering utility provisions such as water and electricity,

| Project stages                               | Key high-level processes                                                                                                                                                                                                                         | Key high-level objective                                                                                | Key high-level deliverables                                                  | Key high-level resources (key driver)                                                                                                          |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| Stage 1: Inception                           | Project need<br>Project manager selection (optional)<br>Project mandate<br>Environmental mandate                                                                                                                                                 | 'What is the need?'                                                                                     | Project initiation document (PID)                                            | Client team<br>Project manager                                                                                                                 |
| Stage 2: Feasibility                         | Project brief<br>Project manager selection<br>Feasibility studies<br>Business case<br>Funding options<br>Delivery parameters                                                                                                                     | 'Is the need feasible?'                                                                                 | Project brief<br>Signing off business case                                   | Client team<br>Project manager<br>Specialist consultants                                                                                       |
| Stage 3: Strategy                            | Project governance<br>Parameters<br>Project strategy<br>Project organisation and control<br>Accountability and responsibility<br>Procurement strategy<br>Selection and appointment of project team<br>Tender procedure<br>Project execution plan | 'How will the need be realised?'                                                                        | Project execution plan                                                       | Client team<br>Project manager<br>Specialist consultants                                                                                       |
| Stage 4: Pre-construction                    | Design delivery process<br>Technical design and production information<br>Value management<br>Procurement of supply chain<br>Contractual arrangements                                                                                            | 'What do we need to build? How would it look like and function? How would we deliver it and manage it?' | Design outputs<br>Contractual arrangements                                   | Client team<br>Project manager<br>Design team<br>CDM coordinator                                                                               |
| Stage 5: Construction                        | Performance monitoring and control<br>Health, safety and welfare systems<br>Quality management and control                                                                                                                                       | 'Are we constructing what has been designed?'                                                           | Performance management plan                                                  | Client team<br>Project manager<br>Design team<br>CDM coordinator<br>Constructor team                                                           |
| Stage 6: Testing and commissioning           | Commissioning services<br>Commissioning documentation                                                                                                                                                                                            | 'Is the building working as designed?'                                                                  | Commissioning documentation                                                  | Client team<br>Project manager<br>Design team<br>CDM coordinator<br>Constructor team<br>Commissioning team                                     |
| Stage 7: Completion, hand over and operation | Planning and scheduling handover<br>Handover procedures<br>Operational commissioning<br>Client occupation                                                                                                                                        | 'How do we use the building?'                                                                           | Handover documentation<br>Health and safety file                             | Client team<br>Project manager<br>Design team<br>CDM coordinator<br>Construction team<br>Commissioning team<br>Occupation and maintenance team |
| Stage 8: Post-completion review and in use   | Postoccupancy evaluation<br>Project audit<br>Project feedback<br>Close-out report<br>Benefits realisation                                                                                                                                        | 'Has the project satisfied the need?'                                                                   | Project close-out report<br>Post-occupancy Evaluation<br>Occupation strategy | Client team<br>Project manager<br>Occupation and maintenance team                                                                              |

Figure 1.8 CIOB Project Stages

delivering high-quality facilities. It makes considerable demands on the control systems, especially those concerned with time and quality. The complex nature of modern buildings and other facilities and their unique interaction with a specific site means that problems will arise and have to be resolved rapidly. Information systems monitoring of the environmental performance targets, and bringing manufacturers, contractors and their supply chains into the project team. Like the earlier stages, the pre-construction stage often requires many different professionals and specialists working in creative and highly interactive ways. It is therefore important that this stage is carefully managed using the control systems established during the strategy stage to provide everyone involved with relevant, timely and accurate feedback about their decisions. Completion of this stage provides all the information needed for construction to begin.

The construction stage is when the actual building or other facility that the client needs is produced. In modern practice, this is a rapid and efficient assembly process are tested to the full, design changes have to be managed, construction and fitting out teams have to be brought into the team and empowered to work efficiently. Costs and time have to be controlled within the parameters of project objectives and the product delivered to the quality and specification as set previously.

The construction stage leads seamlessly into a key stage in modern construction and development projects: the commissioning stage. The complexity and sophistication of modern engineering services makes it essential that time is set aside to test and fine-tune each system. Any environmental performance targets such as Building Research Establishment Environmental Assessment Method (BREEAM) certification can be used as a measure of the project's performance. Therefore, these activities form a distinct and separate stage which should predominantly be complete before beginning the completion, handover and operation stage which is when the client takes over the practically completed building or other facility. In some instances, there may also be some post-occupation commissioning and testing. The client's occupational commissioning needs to be managed as carefully as all the other stages because it can have a decisive influence on the project's overall success and environmental performance. New users always have much to learn about what a new building or other facility provides. They need training and help in making best use of their new building or other facility. It is good practice for their interests and concerns to be considered during the earlier stages and preparation for their move into the new facility at the right time so that there are no surprises when the client's organisation takes occupation.

The final stage is the post-completion review and in-use stage. This provides the opportunity for the project team to consider how well the project's objectives have been met and what lessons should be taken from the project. A formal report describing these matters provides a potentially important contribution to knowledge. For clients who have regular programmes of projects and for project teams that stay together over several projects, such reports provide directly relevant feedback. Even where this is not the case, everyone involved in a project team, including the client, is likely to learn from looking back at their joint performance in a careful objective review. Projects where a BIM (Building Information Modelling) protocol had been established, then information exchange between the delivery team and the operations team will form a key highlight of this stage. In some projects, the

client may wish to extend the services of the project manager (and may be the BIM manager) to facilitate the transition from delivery to operation, including assessment of project benefits and updating the controls and procedures as necessary.

STAGE 1 (CIOB)

INCEPTION

STAGE 0 (RIBA)

STRATEGIC DEFINITION

STAGE 1 (BIM DIGITAL Plan of Work 2013)

STRATEGY

|                          |                                                                                                      |
|--------------------------|------------------------------------------------------------------------------------------------------|
| <b>Key processes:</b>    | Project need<br>Project manager selection<br>Project mandate<br>Environmental mandate<br>BIM mandate |
| <b>Key objective:</b>    | 'What is the need?'                                                                                  |
| <b>Key deliverables:</b> | Project mandate (project initiation document)                                                        |
| <b>Key resources:</b>    | Client team<br>Project manager                                                                       |

### Stage process and outcomes

Inception is the initial stage of the development process; it is a transition between the client's strategic business decision making and the implementation of a project. The stage confirms a need, either business or social, that requires some form of capital development and concludes with the client making a decision to proceed with a detailed appraisal of the viability of the development.

Principally this is a client-led process, but depending on the nature of the client and the complexity of determining the client's requirements it may involve the services of management consultants or a professional adviser and these may be in-house or external to the client's organisation.

### Outcomes:

- Statement of the key business objectives, project mandate and constraints
- Statement of an environmental mandate
- Outline of BIM strategy
- Definition of the project management structure
- Approval to proceed to the feasibility stage
- Appointment of the project manager

### The Client/Owner

#### Client obligations and responsibilities

The client organisation will need to ascertain what the needs and objectives are that the project is aiming to satisfy and how the project fits in with their strategic objectives. The client organisation will also need to establish that it has the resources to develop and deliver the project, including articulating 'vision' and the 'need' into tangible strategies and objectives as well as understanding and delivering its responsibilities and obligations as a client. Having determined the degree of their involvement in the development of the project the client will need to review the extent of external support required.

### **Client project objectives**

The main objective at this stage for the client is to make the decision to invest in a construction or development project. The client should have prepared a project mandate (capital expenditure programme) which will evolve into a business case for the project involving careful analysis of its business, organisation, present facilities and future needs. Experienced clients may have the necessary expertise to prepare their project mandate themselves. Less experienced clients may need help. Many project managers are able to contribute to this process. This process will result in a projects pecific statement of need. The client's objective will be to obtain a totally functional facility, which satisfies this need and must not be confused with the project objectives, which will be developed later from the statement of need.

### **Client project objectives**

The main objective at this stage for the client is to make the decision to invest in a construction or development project. The client should have prepared a project mandate (capital expenditure programme) which will evolve into a business case for the project involving careful analysis of its business, organisation, present facilities and future needs. Experienced clients may have the necessary expertise to prepare their project mandate themselves. Less experienced clients may need help. Many project managers are able to contribute to this process. This process will result in a projectspecific statement of need. The client's objective will be to obtain a totally functional facility, which satisfies this need and must not be confused with the project objectives, which will be developed later from the statement of need.

A sound project mandate will:

- be driven by needs
- be based on sound information and reasonable estimation
- contain rational processes
- be aware of the risks associated
- contain flexibility
- maximise the scope of obtaining best value from resources
- utilise previous experience
- Incorporate sustainability cost-effectively

### **Client engagement: Internal team**

#### **Investment decision maker:**

This is typically a corporate team of senior managers and/or directors who review the potential project and monitors the progress. However, the team seldom is involved directly in the project process.

**Project sponsor:**

Typically a senior person in the client' organisation, acting as the focal point for key decisions about progress and variations. The project sponsor has to possess the skills to lead and manage the client role, have the authority to take day-to-day decisions and have access to people who are making key decisions.

**Client advisor:**

The project sponsor can appoint an independent client advisor (also referred to as construction advisor or project advisor or independent client advisor) who will provide professional advice in determining the necessity of construction and means or procurement, if necessary. If advice is taken from a consultant or a contractor, those organisations have a vested interest not only in confirming the client's need, but also in selling their services and products.

The client advisor can assist with:

- project mandate and business case development (see 'asibility'tage)
- investment appraisal
- designing and planning for sustainability
- understanding the need for a project
- deciding the type of project that meets the need
- generating and appraising options (when appropriate)
- selecting an appropriate option (when available)
- risk assessment (when appropriate)
- advising the client on the choice of procurement route
- selecting and appointing the project team
- measuring and monitoring performance (when appropriate)

The client advisor should understand the objectives and requirements of the client but should remain independent and objective in providing advice directly to the client. Other areas where the client may have sought independent advice include chartered accounting, tax and legal aspects, market research, town planning, chartered surveying and investment banking.

**The Project manager**

Project managers can come from a variety of backgrounds, but all will need to have the necessary skills and competencies to manage all aspects of a project from inception to occupation. This role may be fulfilled by a member of the client' organisation or be an external appointment.

**Project manager' objectives**

The project manager, both acting on behalf of, and representing the client, has the duty of 'oviding a cost-effective and independent service, selecting, correlating, integrating and managing different disciplines and expertise, to satisfy the objectives and provisions of the project brief from inception to completion. The service provided must be to the client' satisfaction, safeguard his interests at all times, and, where possible, give consideration to the

needs of the eventual user of the facility' The key role of the project manager is to motivate, manage, coordinate and maintain the morale of the whole project team. This leadership function is essentially about managing people and its importance cannot be overstated. A familiarity with all the other tools and techniques of project management will not compensate for shortcomings in this vital area. In dealing with the project team, the project manager has an obligation to recognise and respect the professional codes of the other disciplines and, in particular, the responsibilities of all disciplines to society, the environment and each other. There are differences in the levels of responsibility, authority and job title of the individual responsible for the project, and the terms project manager, project coordinator and project administrator are all widely used. It is essential, in order to ensure an effective and cost-effective service, that the project should be under the direction and control of a competent practitioner with a proven project management track record developed from a construction industry related professional discipline. This person is designated the project manager and is to be appointed by the client with full responsibility for the project. Having delegated powers at inception, the project manager may exercise, in the closest association with the project team, an executive role throughout the project with appropriate input from the client.

### **Project manager's duties**

The duties of a project manager will vary depending on the client's expertise and requirements, the nature of the project, the timing of the appointment and similar factors. If the client is inexperienced in construction, the project manager may be required to develop his own brief. Whatever the project manager's specific duties in relation to the various stages of a project, there is the continuous duty of exercising control of project time, cost and performance. Such control is achieved through forward thinking and the provision of good information as the basis for decisions for both the project manager and the client. A matrix correlating suggested project management duties and client's requirements is given in Table 1.1.

The term 'project coordinator' is applied where the responsibility and authority embrace only part of the project, for example, pre-construction, construction and handover/ migration stages. (For professional indemnity insurance purposes a distinction is made between project management and project coordination. When the project manager appoints other consultants the service is defined as project management and when the client appoints other consultants the service is defined as project coordination.)

### **Project manager's appointment**

It is advisable to appoint the project manager at the inception stage so that the project manager can advise and become involved in the option appraisal process. This should ensure professional, competent management coordination, monitoring and controlling of the project to its satisfactory completion, in accordance with the client's brief. However, depending on the nature and type of the project and the client's in-house expertise, the project manager could be appointed as late as the start of the strategy stage, but this could deprive them of important background information and is therefore not generally recommended.

| Duties *                                                        | Client's requirements       |                      |                                |                      |
|-----------------------------------------------------------------|-----------------------------|----------------------|--------------------------------|----------------------|
|                                                                 | In-house project management |                      | Independent project management |                      |
|                                                                 | Project management          | Project coordination | Project management             | Project coordination |
| Be named in the contract                                        | ■                           |                      | +                              |                      |
| Assist in preparing the project brief                           | ■                           |                      | ■                              |                      |
| Develop project manager's brief                                 | ■                           |                      | ■                              |                      |
| Advise on budget/funding/programme/risk management arrangements | ■                           |                      | +                              |                      |
| Advise on site acquisition, grants and planning                 | ■                           |                      | ■                              |                      |
| Arrange feasibility study and report                            | ■                           | +                    | ■                              | +                    |
| Develop project strategy                                        | ■                           | +                    | ■                              | +                    |
| Prepare project handbook                                        | ■                           | +                    | ■                              | +                    |
| Develop consultant's briefs                                     | ■                           | +                    | ■                              | +                    |
| Devise project programme                                        | ■                           | +                    | +                              | +                    |
| Select project team members                                     | ■                           | +                    | ■                              | +                    |
| Establish management structure                                  | ■                           | +                    | ■                              | +                    |
| Coordinate design processes                                     | ■                           | +                    | ■                              | +                    |
| Appoint consultants                                             | ■                           | ■                    | ■                              | +                    |
| Arrange insurance and warranties                                | ■                           | ■                    | ■                              | +                    |
| Select procurement system                                       | ■                           | ■                    | ■                              | +                    |
| Arrange tender documentation                                    | ■                           | ■                    | ■                              | +                    |
| Organise contractor prequalification                            | ■                           | ■                    | ■                              | +                    |
| Evaluate tenders                                                | ■                           | ■                    | ■                              | +                    |
| Participate in contractor selection                             | ■                           | ■                    | ■                              | +                    |
| Participate in contractor appointment                           | ■                           | ■                    | ■                              | +                    |
| Organise control systems including reporting procedures         | ■                           | ■                    | ■                              | ■                    |
| Monitor progress                                                | ■                           | ■                    | ■                              | ■                    |
| Manage and monitor meetings                                     | ■                           | ■                    | ■                              | ■                    |
| Authorise payments                                              | ■                           | ■                    | ■                              | +                    |
| Organise communication/reporting systems                        | ■                           | ■                    | ■                              | ■                    |
| Provide project coordination                                    | ■                           | ■                    | ■                              | ■                    |
| Issue health and safety procedures                              | ■                           | ■                    | ■                              | ■                    |
| Address environmental aspects                                   | ■                           | ■                    | ■                              | ■                    |
| Coordinate statutory authorities                                | ■                           | ■                    | ■                              | ■                    |
| Monitor budget and changes                                      | ■                           | ■                    | ■                              | ■                    |
| Develop final account                                           | ■                           | ■                    | ■                              | ■                    |
| Arrange pre-commissioning/commissioning                         | ■                           | ■                    | ■                              | ■                    |

Figure 1.9. The Project manager's responsibilities

| Duties *                                                      | Client's requirements       |                      |                                |                      |
|---------------------------------------------------------------|-----------------------------|----------------------|--------------------------------|----------------------|
|                                                               | In-house project management |                      | Independent project management |                      |
|                                                               | Project management          | Project coordination | Project management             | Project coordination |
| Organise handover/occupation                                  | ■                           | ■                    | ■                              | ■                    |
| Advise on marketing/disposal                                  | ■                           | +                    | ■                              | +                    |
| Organise maintenance manuals                                  | ■                           | ■                    | ■                              | +                    |
| Plan for maintenance period                                   | ■                           | ■                    | ■                              | ■                    |
| Develop maintenance programme/<br>staff training              | ■                           | ■                    | ■                              | +                    |
| Plan facilities management and<br>coordinate BIM              | ■                           | ■                    | ■                              | +                    |
| Arrange for feedback monitoring and<br>post-completion review | ■                           | ■                    | ■                              | +                    |
| Investigate BIM Implementation                                | ■                           | ■                    | ■                              | ■                    |
| Liaise with funding Institutions                              | ■                           | ■                    | ■                              | +                    |
| Liaise with ground landlord                                   | ■                           | +                    | ■                              | +                    |
| Liaise on acquisition, valuation,<br>disposal of land         | ■                           | +                    | ■                              | +                    |
| Liaise with agents over leasing tenants<br>queries, etc.      | ■                           | +                    | ■                              | +                    |
| Liaise with client over move to new<br>premises               | ■                           | +                    | ■                              | +                    |
| Liaise coordination with legal agents                         | ■                           | +                    | ■                              | +                    |
| Advise and manage client's changes                            | ■                           | ■                    | ■                              | ■                    |

Figure 1.9. The Project manager's responsibilities (continued)

## Project mandate

The project mandate could be defined as the authority given to the project team to develop and progress the project within given and agreed boundaries, set by the client. These will include requirements on programme for delivery of the project, the budget and also the requirements for the finished building in terms of function, quality and any particular requirements on performance, such as environmental performances. Understanding the client need as clearly as possible at the start of the project is fundamental to project success.

The project mandate (also referred to as initial project inquiry (IPI) or project initiation document (PID)) is usually the first document produced to trigger a project. It is not seen as a project documentation but as a pre-project document. However, often the trigger to a project is poor and it is advisable to put together a document, which encapsulated the ideas and any basic information that can be identified at this point. Some key questions that may be considered while preparing the project mandate include:

- Is the level of authority commensurate with the anticipated size, risk and cost of the project?
- Is there sufficient detail to allow the appointment of key team members including the project manager?

- Are all the known (internal) stakeholders identified?
- Does the project mandate identify what is necessary for the project to be a success (key success criteria)?

### **Environmental mandate**

Environmental performance and impact may be particularly important to the client. Corporate Social Responsibility plays an important role in the delivery of built environment projects. Environmental mandate includes requirements for the environmental performance of the building. It may also include requirements on carbon emissions and energy consumption.

In addition, it may also prescribe requirements for environmental impact on the local topography or adjacent area. Lastly it may determine outcomes in terms of the local community, such as providing employment and training opportunities or the use of local supply chain. An environmental mandate for the project will provide the management framework for the planning and implementation of construction activities in accordance with the environmental commitments of the organisation, the project context, funders, project end users or any other stakeholders.

The environmental mandate will influence key design parameters relating to sustainability, performance and operational technologies. The environmental mandate should also outline the overall environmental management criteria for the project including what are the key success factors for the projects in terms of environmental management.

### **BIM mandate**

BIM (building information modelling) enables the sharing of information and data between all stakeholders and participants around the whole asset lifecycle. It provides a platform for consistent, structured, perfect data, to enable informed smart decision making at all stages of the project process.

If BIM is to be used on a project, then this should be implemented right from the start. As industry adopts BIM as the normal way of working, this will become standard practice. However for the moment, migrating the project to BIM might occur at any stage. Naturally this has consequences in terms of cost, time, resources required and scale of difficulty.

When BIM is being used, then it is important to establish the drivers for this. If it is client driven, what does the client require of the project BIM? Is it simply for efficiency of process or will outputs be required at various stages in accordance with COBie (Construction Operations Building Information Exchange) advise, and at handover the model and data sets used for FM/operations and integration with their building management systems?

A Project BIM Execution Protocol (see BIM Protocol – Standard Protocol for use in projects using Building Information Models – CIC/BIM Pro – first edition 2013) must be established to ensure BIM is used to maximum advantage and that the whole team is working together in a consistent manner.

|              |
|--------------|
| NAME .....   |
| COURSE ..... |

### Exercises

1. Describe the meaning of BIM.

.....

.....

.....

2. Briefly explain what the environmental mandate includes?

.....

.....

.....

3. Name the 3 alternative names given to the initial development process.

a. .... b. .... c. ....

4. In the Project Life Cycle, ISO 21500:2012 it names stage 4 as 'Controlling'. Name the 3 other equivalent descriptions occurring at the same time used by other institutions.

a. .... b. .... c. ....

5. Each stage of the project relates to specific key decisions. At Stage 2, Feasibility, name the key drivers.

a. .... b. .... c. ....

6. The duties of the Project Manager are extensive. List 5 duties that are not included in the project coordination duties.

a. ....

b. ....

c. ....

d. ....

e. ....

7. What is the purpose of project management according to The Construction Industry Council?

.....

.....

.....

8. What environmental assessment method is used to measure a building's environmental performance?

.....

9. Using a diagram, draw the key project constraints.

10. What is the CIOB definition of Project Management?

.....

.....

.....