distribution of tasks. Clearly, these projects were procured with great consciousness of the importance of time, cost and quality which are the cornerstones of project management.

There are numerous examples of the achievements of project management throughout history; the Medieval cathedrals representing the dominance of faith over territories, the architecture of the eighteenth century representing classic perfection, or the great triumphs of urban planning in the late nineteenth century representing the steady increase of engineering sophistication. It was, however, the great wars in the twentieth century which gave new impetus to the development of scientific ways of organizing and undertaking complex operations. New project planning techniques emerged as well as new approaches to general management. Henry Gantt's bar chart used for production scheduling at the Frankfort arsenal in 1917 became an essential tool for project management and it is still widely used in an essentially unaltered form. Critical path analysis developed by Wright in 1918 to show the relationships between activities is another example of a technique which plays an essential role in modern management.[1]

Although many of the early codifications of principles and practices were developed in the first half of the twentieth century, project management in its modern form extends back only thirty to forty years. The project management processes and techniques used in the Manhattan Atom Bomb project (1940–1945), became the model for the management of later projects such as the Polaris Missiles (1955–1960) and the Apollo Moon Programme (1960–1970). The evolution of project management and its new role as a defined professional discipline in its own right is now universally apparent as new roads or bridges open, as major buildings rise, as new computer systems come on line or as spectacular shopping centres and urban projects unfold. The use of its principles and practices can assist in the elimination of the need to rely on luck to attain a successful outcome for a project.

PROJECT MANAGEMENT TECHNIQUES AND PRACTICES

The Code of Practice for Project Management of the Chartered Institute of Building[2] defines project management as:

> the overall planning, co-ordination and control of a project from inception to completion aimed at meeting a Client's requirements in order to produce a functionally and financially viable project that will be completed on time within authorised cost and to the required quality standards.

In other words, a 'project' is a process of creating a specific result; a means to an end. Project management deals with the co-ordination and integration of the process. A project can be further defined as a non-routine activity; a separate undertaking having time, cost, quality constraints and objectives. A project usually involves multiple disciplines in new and complex activities with clear start and end dates. It involves greater risks than operations which are simply 'business as usual' and can become an agent of change.

Paralleling the method outlined in previous chapters for urban design, the life cycle of a specific undertaking in project management terms can be subdivided into four major stages, namely: 'Project Definition Stage', 'Project Planning Stage', 'Project Implementation Stage' and 'Project Closure Stage' (Figure 8.1). These stages and the activities that take place at each stage are described below.

PROJECT DEFINITION STAGE

Most projects emerge from a strategic objective or investment aim established by an individual or an organization. In project management terms the individual or the organization responsible for formulating the preliminary project concepts is referred to as the client or project sponsor. The client is responsible for defining the business requirements; justifying funding; setting success criteria; reviewing