



**Figure 8.9** Work breakdown structure.

to the project. It also helps in defining work packages, establishing cost breakdown structures, organizational breakdown structures and project estimates, permitting the development of the project network and programme. The work breakdown structure should specify clear deliverables for each activity. In practice, when all the activities identified in the work breakdown structure are finished, the project is completed. The work breakdown structure assists in establishing in detail ‘what’ has to be achieved in terms of meeting the project requirements. It also helps in identifying ‘who’ is accountable for achieving it, ‘how’ it is going to be achieved in terms of detailed action and ‘when’ it is going to be achieved in terms of milestones and target dates (see Figure 8.9).

The critical path is one of the techniques most commonly used in building a project network. Once all the detailed activities have been identified, it is possible to create a network which shows the dependencies of activities and work packages. A critical path shows the sequence of the project activities and how they depend on each other. It also reveals those activities which are critical for completing the project on time. This sequence of activities, known as the critical path, determines how long the project will take to complete. Any delays to the activities on the critical path will delay the overall completion of the project.

With simple projects it is possible to find the critical path by ascertaining the duration of the activities that form the project and the sequential path that these activities follow. With more complex projects, project management software is used to undertake these arithmetic calculations. By networking the activities of the project it is possible to have a clearer understanding of the critical activities which can constrain the project’s success. It also enables the project duration to be optimized by focusing on the activities that form the critical path, as it is these that can affect the progress of the project (see Figure 8.10).

Once the work breakdown structure has been defined and the network has been established, it is possible to create the project schedule. The project schedule contains key information regarding the viability of completing the work in the given timescales with the given resources. It identifies key events which, if late, could delay the programme and the project milestones or those points against which progress can be monitored.

Gantt charts or bar charts are particularly useful for displaying a schedule of project activities in a cascading form, whilst showing in a graphical way their durations and their start and finish dates (Figure 8.11). Gantt charts are also useful for illustrating who is responsible for given activities and for displaying key events and project milestones. They