Chapter 9

Project management

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Learning objectives

- After this lecture, you will be able to:
  - understand the main elements of the project management approach;
  - relate the concept of project management to the creation of BIS;
  - assess the significance of the different tasks of the project manager;
  - outline different techniques for project management.

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Project

- **A project**
  - Is a set of activities with a clear beginning and end
- **Projects**: Projects are unique, one-time operations designed to accomplish a specific set of objectives in a limited timeframe.
- Each project has
  - Goals
  - Objectives
  - Tasks
  - Limitations

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Managing a project

- To manage a project need:
  - Process
  - Tools
  - Techniques

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Five phases of project management

1. Initiating/defining
   - State the problems/goals
   - Identify the objectives
   - Secure resources
   - Explore costs/benefits in feasibility study

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Five phases of project management

2. Planning
   - Identify and sequence activities
   - Identify the "critical path"
   - Estimate time and resources needed for completion
   - Write a detailed project plan
3. Executing
   - Commit resources to specific tasks
   - Add additional resources/personnel if necessary
   - Initiate project work

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Five phases of project management

4. Controlling
   - Establish reporting obligations
   - Create reporting tools
   - Compare actual progress with baseline
   - Initiate control interventions if necessary

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Five phases of project management

5. Closing
   - Install all deliverables
   - Finalize all obligations/commitments
   - Meet with stakeholders
   - Release project resources
   - Document the project
   - Issue final report

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The challenge

- A recent study questioned 1500 IT project managers across the UK in all industrial sectors. The outcomes of the survey are reported by Huber (2003) and found that:
  - 84% of IT projects failed to hit their targets on budget, schedule and scope;
  - 45% of IT projects failed to complete on time;
  - 54% of IT projects failed to deliver on the planned-for functionality.

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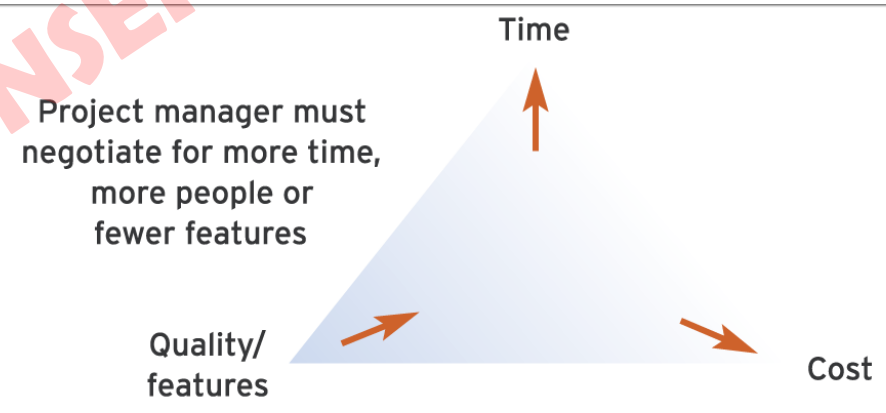

Figure 9.1 Three key elements of project management

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Why do projects fail? 1

- Lytinen and Hirscheim (1987) researched the reasons for information systems projects failing. They identified five broad areas which still hold true today:
- **Technical failure** stemming from poor technical quality – this is the responsibility of the organisation's IS function.
- **Data failure** due to (a) poor data design, processing errors and poor data management and (b) poor user procedures and poor data quality control at the input stage. Responsibility for the former lies with the IS function, while that for the latter lies with the end-users themselves.

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Why do projects fail? 2

- **User failure** to use the system to its maximum capability – may be due to an unwillingness to train staff or user management failure to allow their staff full involvement in the systems development process.
- **Organisational failure**, where an individual system may work in its own right but fails to meet organisational needs as a whole (e.g. while a system might offer satisfactory operational information, it fails to provide usable management information). This results from senior management's failure to align IS to overall organisational needs.
- **Failure in the business environment** – this can stem from systems that are inappropriate to the market environment, failure in IS not being adaptable to a changing business environment (often rapid change occurs), or a system not coping with the volume and speed of the underlying business transactions.

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Project organisation

- **Project sponsor**: The project sponsor's role is to provide a justification of the project to senior management.
- **Project manager**: Appointed by the project sponsor, the project manager's role is to provide day-to-day management and ensure that *project* objectives are met.
- **Project user**: The project user is the person or group of people who will be utilising the outcome of the information systems project.
- **Quality manager**: This role involves defining a plan containing procedures that ensure that quality targets are met.
- **Risk manager**: All projects contain some risk that the investment made will not achieve the required business objectives.

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Project management process

- The project management process includes the following main elements:
  - estimate;
  - schedule/plan;
  - monitoring and control;
  - documentation.

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Estimation

- **Estimation**: Estimation allows the project manager to plan for the resources required for project execution through establishing the number and size of tasks that need to be completed in the project.

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- [1] **Work breakdown Structure (WBS)**: This is a breakdown of the project or a piece of work into its component parts (tasks).
- [1] **Project constraints**: Projects can be resource-constrained (limited by the type of people, monetary or hardware resources available) or time-constrained (limited by the deadline).

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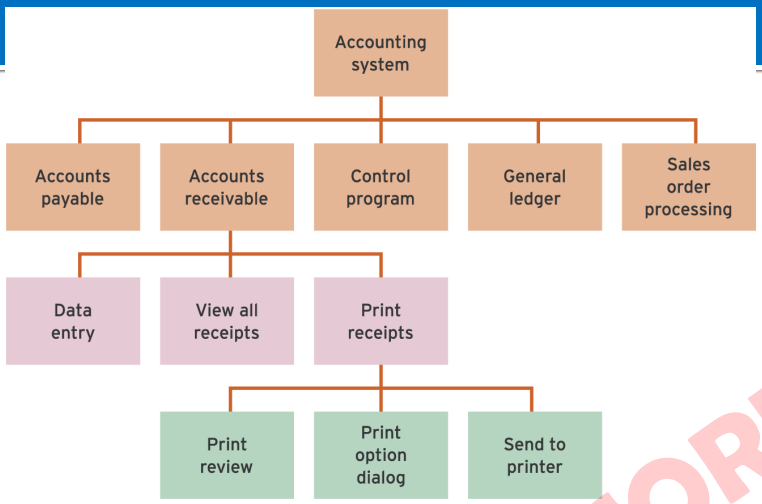

Figure 9.2 Work breakdown structure (WBS) for an accounting system

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Effort and elapsed time

$$\text{Elapsed time} = \text{Effort time} = \frac{100}{Availability\,\%} \times \frac{100}{Work\ rate\%}$$

- Effort time is the total amount of work that needs to occur to complete a task.
- The elapsed time indicates how long in time (such as calendar days) the task will take (duration).

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Estimation

- Estimate effort time for average person to undertake task.
- Estimate different work rates and availability of staff.
- Allocate resources (staff) to task.
- Calculate elapsed time on the basis of the number of staff, availability and work rate.
- Schedule task in relation to other tasks.

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COCOMO

- **Constructive cost model (COCOMO)**: A model used to estimate the amount of effort required to complete a project on the basis of the estimated number of lines of program code

$$WM = C \times (KDSI)^K \times EAF$$

  - where:
  - *WM* = number of person months,
  - *C* = one of three constant values dependent on development mode,
  - *KDSI* = delivered source lines of code 1000,
  - *K* = one of three constant values dependent on development mode,
  - *EAF* = effort adjustment factor.

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Function point analysis

- **Function point analysis**: A method of estimating the time it will take to build a system by counting up the number of functions and data inputs and outputs and then comparing to completed projects.
- The five user function categories are:
- number of external input types;
- number of external output types;
- number of logical internal file types;
- number of external interface file types;
- external enquiry types.

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Scheduling

- **Scheduling**: Scheduling involves determining when project activities should be executed.
- The finished schedule is termed the project plan.
- **Resource allocation**: This activity involves assigning a resource to each task.

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Figure 9.3 Serial relationship of activities

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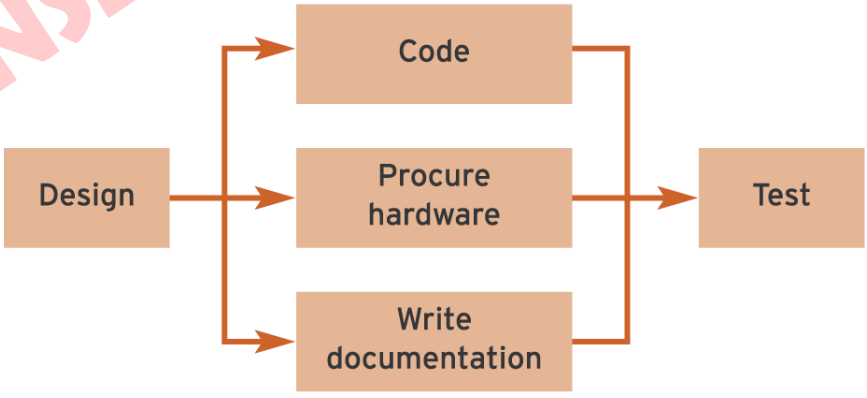

Figure 9.4 Parallel relationship of activities

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Monitoring and control

- **Monitoring and control**:
- Monitoring involves ensuring that the project is working to plan once it is started.
- Control is taking corrective action if the project deviates from the plan.

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PRINCE

- **PRINCE**: A project management methodology that has been developed to be compatible with the system development methodologies such as SSADM (Structured Systems Analysis & Design Method) .
- PRINCE defines four main project aims:
  - to deliver the required end-product(s);
  - to meet the specified quality;
  - to stay within budget;
  - to deliver on schedule.

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PRINCE plans

- **Project plan**: This shows the main activities within the project, providing an overall schedule and identifying resources needed for project implementation.
- **Stage plan**: A stage plan is produced at the end of each previous stage in the project. The project board reviews all progress against the plan and takes corrective action as necessary.
- **Detailed plan**: If a project is already broken down into stages, a detailed plan may not be required. However, for large projects with few stages, a series of detailed plans may be needed.

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PRINCE plans

- There are also two additional types of plan to complete the planning structure:
  - **Individual work plan**: This provides the allocation of work of a project. This information is extracted from tasks listed in the stage plan or detailed plan.
  - **Exception plan**: Exception plans enable 'out-of-control' behaviour within a stage plan to be reported to the project board. This is required if the project moves outside tolerance margins set by the project board. The exception plan replaces the stage, detailed and individual work plan for that stage.

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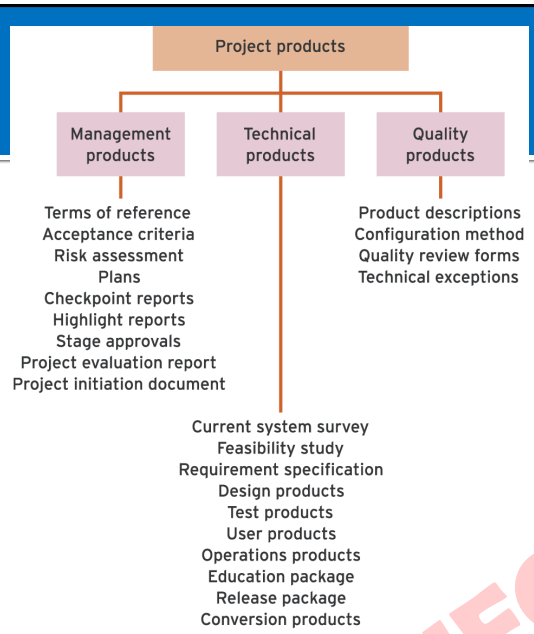

Figure 9.5 PRINCE product breakdown structure

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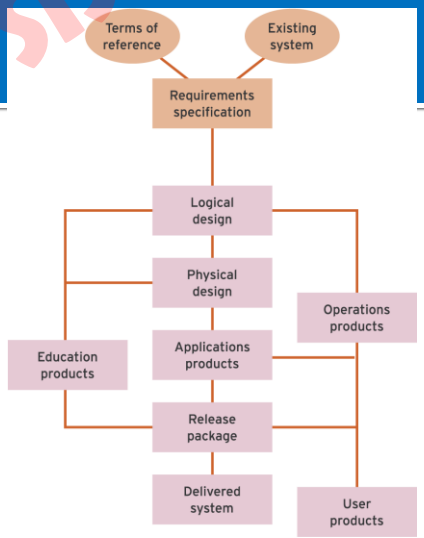

Figure 9.6 A top-level PRINCE product flow diagram

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The Critical path

- **Critical path**: Activities on the critical path are termed critical activities. Any delay in these activities will cause a delay in the project completion time.
- **Critical path method (CPM)**: Critical path diagrams show the relationship between activities in a project.

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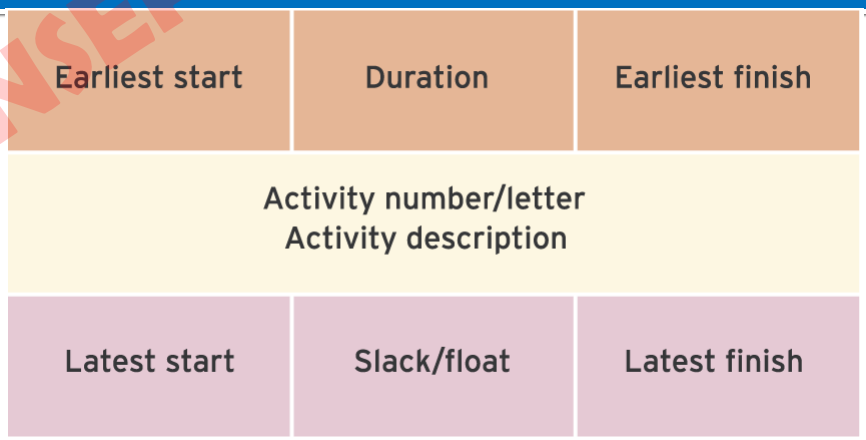

Figure 9.7 Activity-on-node notation

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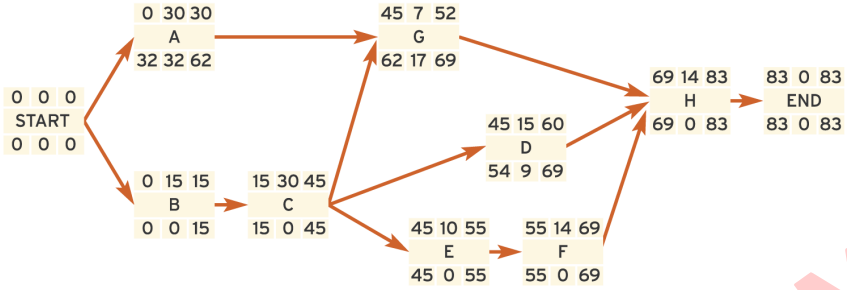

Figure 9.8 Activity on node network diagram

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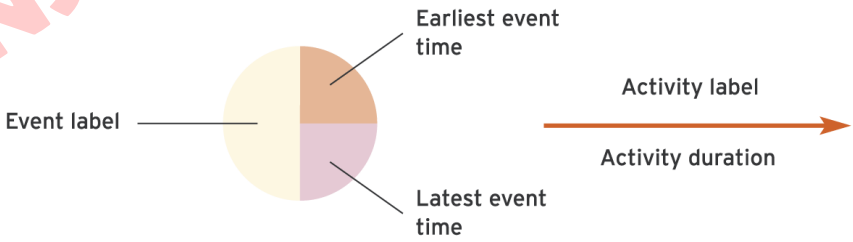

Figure 9.9 Activity-on-arrow notation

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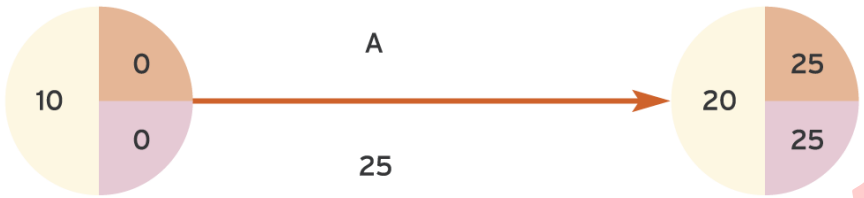

Figure 9.10 Calculating event times for an activity-on-arrow network

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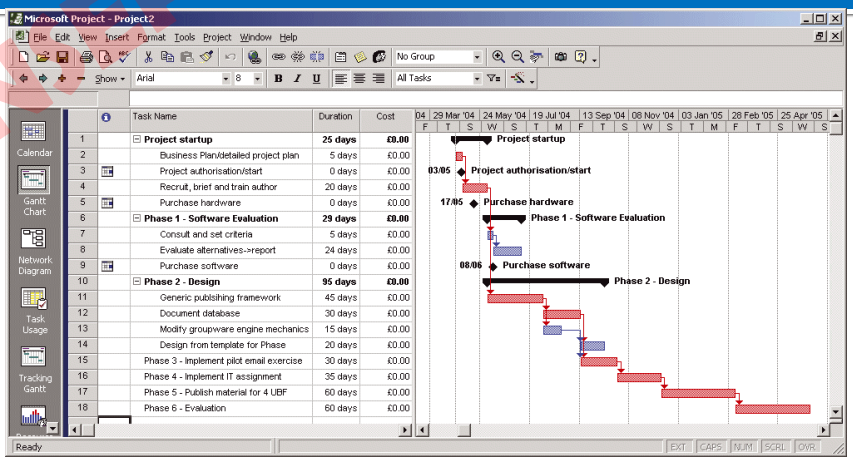

Figure 9.11 Gantt chart showing activities and milestones

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Project Evaluation and Review Technique (PERT)

$$t_e = \frac{t_o + 4t_m + t_p}{6}$$

- **PERT**: PERT replaces the fixed activity duration used in the CPM method with a statistical distribution which uses optimistic, pessimistic and most likely duration estimates.
- Where t(e) is the Expected time, t(o) is the Optimistic time, t(m) is the most probable activity time and t(p) is the Pessimistic time.

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