

Chapter 4

Project Management

Project Management

1.0 Introduction

Project management is concerned with the overall planning and co-ordination of a project from conception to completion aimed at meeting the stated requirements and ensuring completion on time, within cost and to required quality standards.

Project management is normally reserved for focused, non-repetitive, time-limited activities with some degree of risk and that are beyond the usual scope of operational activities for which the organization is responsible.

Learning Objective:

At the end of this lesson, participants shall be able to understand:

- Concept of Project Management
- Project Management Life Cycle
- Skills needed & jobs of a Project Manager
- Project planning Technique

2.0 What is a project?

A project is generally defined as a programme of work to bring about a beneficial change and which has: -

- A start and an end i.e. expected schedule and period
- A multi-disciplinary team brought together for the project
- Constraints of cost, time and quality
- A scope of work that is unique and involves uncertainty

Examples of a project are: -

- The development and introduction of new services
- The development of a management information system
- The introduction of an improvement to an existing process
- Setting up a new care initiative
- The creation of a large tender or the preparation of a response to it
- The production of a new customer newsletter, catalogue or Web site

2.1 How is a project different to any other work?

A continuous process is not a project. The development of a new rent or lettings policy is a project but the subsequent day-to-day operation of that policy is a continuous process that is usually managed by an individual or a department.

2.2 When is Project Management relevant?

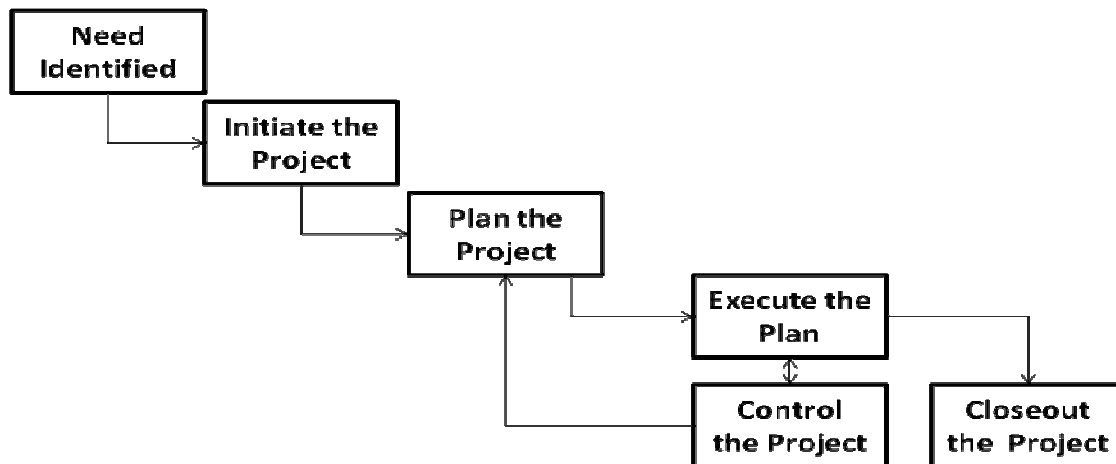
Project management is relevant to any job if it has the following features:-

- A defined goal
- Time, cost and quality (or functionality) constraints
- Requires expertise and support from other functions
- Involves a unique (to you or the organization) scope of work

Using a project team approach helps to achieve the beneficial gain in a structured, controlled and cost effective way.

3.0 Project Management Life Cycle

The project management life cycle encompasses various stages through which a project passes from beginning to end. The process flow of Project management life cycle is shown below:-



3.1 Need Identification

This stage involves the project manager and sponsor in the preparation and approval of an outline of project justification, time lines, budget, plans etc.

3.2 Initiation

Initiating is the basic processes that should be performed to get the project started. This starting point is critical because those who will deliver the project, those who will use the project, and those who will have a stake in the project need to reach an agreement on its initiation. Involving all stakeholders in the project phases generally improves the probability of satisfying customer requirements by shared ownership of the project by the stakeholders. The success of the project team depends upon starting with complete and accurate information, management support, and the authorization necessary to manage the project.

3.3 Planning

The planning phase is considered the most important phase in project management. Project planning defines project activities that will be performed; the products that will be produced, and describes how these activities will be accomplished and managed. Project planning defines each major task, estimates the time, resources and cost required, and provides a framework for management review and control. Planning involves identifying and documenting scope, tasks, schedules, cost, risk, quality, and staffing needs.

The result of the project planning, the project plan, will be an approved, comprehensive document that allows a project team to begin and complete the work necessary to achieve the project goals and objectives. The project plan will address how the project team will manage the project elements.

3.4 Executing

Once a project moves into the execution phase, the project team and all necessary resources to carry out the project should be in place and ready to perform project activities. The project team and the project manager's focus now shifts from planning the project efforts to participating, observing, and analyzing the work being done.

The execution phase is when the work activities of the project plan are executed, resulting in the completion of the project deliverables and achievement of the project objective(s). This phase brings together all of the project management disciplines, resulting in a product or service that will meet the project deliverable requirements and the customers need. During this phase, elements completed in the planning phase are implemented, time is expended, and money is spent.

In short, it means coordinating and managing the project resources while executing the project plan, performing the planned project activities, and ensuring they are completed efficiently.

3.5 Controlling

Project Control function involves comparing actual performance with planned performance and taking corrective action to get the desired outcome when there are significant differences. By monitoring and measuring progress regularly, identifying variances from plan, and taking corrective action if required, project control ensures that project objectives are met.

3.6 Closeout or Closure

Project closeout is performed after all defined project objectives have been met and the customer has formally accepted the project's deliverables and end product or, in some instances, when a project has been cancelled or terminated early. Although, project closeout is a routine process, it is an important one. By properly completing the project closeout, organizations can benefit from lessons learned and information compiled. The project closeout phase is comprised of contract closure and administrative closure.

4.0 Job of a Project Manager

Typically a project manager will be nominated to lead a project and will be expected to be fully accountable for meeting its objectives. The project manager will be the leader of the project team and will be responsible for ensuring that followings are completed in a timely way:-

- Getting approval for the project objectives and goals
- Selecting and leading the team and setting individual objectives
- Ensuring a feasibility study is complete
- Ensuring that the project is planned in appropriate detail
- Allocating resources for different activities
- Monitoring various activities alongwith cost incurred
- Motivating the team members
- Reporting progress back to the organization
- Helping the team to solve project problems
- Achieve the goals, through the teams
- Reviewing and closing down etc.

4.1 Skills needed by a project manager

Very broad skills and a deal of experience are needed to manage a large project successfully. These include business knowledge, technical skills and individual and team leadership skills.

Individual Skills

The personal skills are likely to include good presentation and persuasive skills, good written skills and credibility.

Team Skills

A project manager is expected to appreciate the differing needs of both individuals and the project team at different stages of the project. The project manager is expected to promote and maintain team spirit among team members.

Technical Skills

A project manager should have technical skills in setting objectives, planning complex tasks, negotiating resource, financial planning, contract management, monitoring skills, creative thinking and problem solving, as well as his own specialized topic/area.

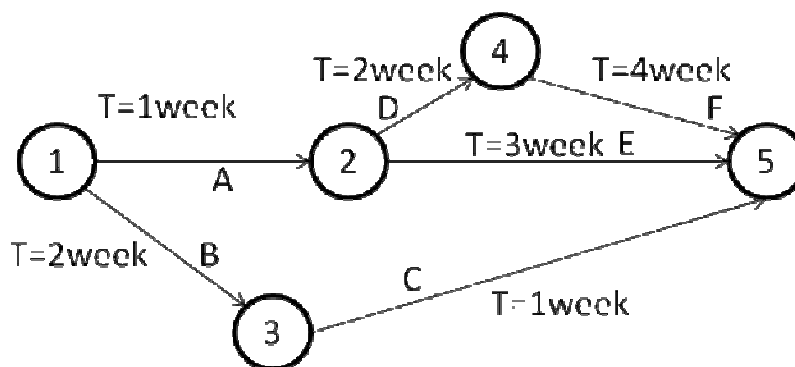
5.0 Project Planning Technique –PERT

The *Program Evaluation and Review Technique* (PERT) is a network model that allows for randomness in activity completion times. PERT was developed in the late 1950's for the U.S. Navy's Polaris project having thousands of contractors. It has the potential to reduce both the time and cost required to complete a project.

5.1 The Network Diagram

In a project, an activity is a task that must be performed and an event is a milestone marking the completion of one or more activities. Before an activity can begin, all of its predecessor activities must be completed. Project network models represent activities and milestones by arrows and nodes respectively.

In PERT diagram, the activities are represented on the arrows and milestones on the nodes. The Figure below shows a simple example of a PERT diagram.



The milestones generally are numbered so that the ending node of an activity has a higher number than the beginning node. The activities in the above diagram are labeled with letters along with the expected time required to complete the activity.

5.2 Steps in the PERT Planning Process

The steps involved in PERT planning process are as under:-

5.2.1 Identify activities and milestones

The activities are the tasks required to complete the project. The milestones are the events marking the beginning and end of one or more activities.

5.2.2 Determine activity sequence

This step may be combined with the activity identification step since the activity sequence is known for some tasks. Other tasks may require more analysis to determine the exact order in which they must be performed.

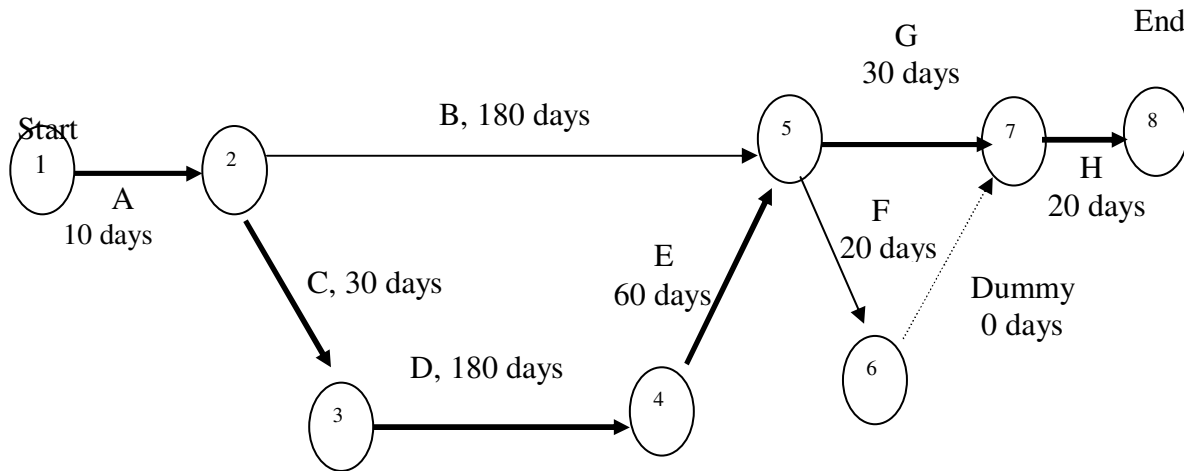
5.2.3 Construct the Network Diagram

Using the activity sequence information, a network diagram can be drawn showing the sequence of the serial and parallel activities.

Below is an **example** of preparing a **Network Diagram** for the “**Installation of new landline exchange**”.

	Activity description	Activity code	Duration	Preceding activity
1	Sanction of project estimate	A	10 days	-
2	Equipment/cable procurement	B	180 days	A
3	Land acquisition	C	30 days	A
4	Building construction (civil works)	D	180 days	C
5	Electrical works	E	60 days	D
6	Battery & power plant installation	F	20 days	B, E
7	Installation of equipment & MDF	G	30 days	B, E
8	Testing & Acceptance Testing	H	20 days	F,G

Note: Above is only an indicative list. Each work can further be split into many activities.



Above is a very simplistic model for understanding activities. Actual will vary. It can be seen that if land acquisition, civil work, electrical work gets completed early, up to 90 days can be saved as equipment delivery takes only 180 days. Similarly any delay in one activity affects overall execution time if no slack (margin) is available. For example, delay in equipment supply can be tolerated for 90 days. Applying the definition of critical path (the longest path on the network from start node to end node), we can easily find it as the darkened path. Project manager has to identify, sequence, plan all activities, allocate resources, manages risk and take dynamic decisions to achieve result in defined time & cost.

5.2.4 Estimate activity times

Weeks are a commonly used unit of time for activity completion, but any consistent unit of time can be used.

A distinguishing feature of PERT is its ability to deal with uncertainty in activity completion times. For each activity, the model usually includes three time estimates:-

- **Optimistic time (OT)** - generally the shortest time in which the activity can be completed. (This is what an inexperienced manager believes!)
- **Most likely time (MT)** - the completion time having the highest probability. This is different from expected time. Seasoned managers have an amazing way of estimating very close to actual data from prior estimation errors.
- **Pessimistic time (PT)** - the longest time that an activity might require.

The expected time for each activity can be approximated using the following weighted average:

$$\text{Expected time} = (OT + 4 \times MT + PT) / 6$$

This expected time might be displayed on the network diagram.

Variance for each activity is given by: $[(PT - OT) / 6]^2$

5.2.5 Determine the Critical Path

The critical path is determined by adding the times for the activities in each sequence and determining the longest path in the project. The critical path determines the total time required for the project.

If activities outside the critical path speed up or slow down (within limits), the total project time does not change. The amount of time that a non-critical path activity can be delayed without delaying the project is referred to as *slack time*.

Since the critical path determines the completion date of the project, the project can be accelerated by adding the resources required to decrease the time for the activities in the critical path. Such a shortening of the project sometimes is referred to as *project crashing*.

5.2.6 Update as project progresses

Make adjustments in the PERT chart as the project progresses. As the project unfolds, the estimated times can be replaced with actual times. In cases where there are delays, additional resources may be needed to stay on schedule and the PERT chart may be modified to reflect the new situation.

5.3 Benefits of PERT

PERT is useful because it provides the following information:

- Expected project completion time.
- Probability of completion before a specified date.
- The critical path activities that directly impact the completion time.
- The activities that have slack time and that can lend resources to critical path activities.
- Activities start and end dates.

6.0 Software for Project Management

Simpler projects can be managed manually by making Network diagram etc. But for complex projects, it becomes essential to use some project management software. There

are several project management software available in the market. Two of them are briefly discussed below:-

6.1 Microsoft Project

Microsoft Project is a project management software program developed and sold by Microsoft which is designed to assist project managers in developing plans, assigning resources to tasks, tracking progress, managing budgets and analyzing workloads.

The application creates critical path schedules, although critical chain and event chain methodology third-party add-ons are available. Schedules can be resource leveled, and chains are visualized in a Gantt chart (in the form of horizontal bars). Additionally, Project can recognize different classes of users. These different classes of users can have differing access levels to projects, views, and other data. Custom objects such as

calendars, views, tables, filters and fields are stored in an enterprise global which is shared by all users.

6.2 Primavera

Primavera Systems Inc. provides project and program management software for the Architecture, Engineering and Construction industry. Focused on project portfolio management, or PPM, Primavera's solutions let users measure progress, assure governance, improve team collaboration and prioritize project investments and resources.

The newest addition to the suite of project management solutions is Primavera P6, which is an integrated PPM (project portfolio management) solution that provides a real-time view of portfolio performance. P6 also offers what-if scenario modeling, tabular scorecards and capacity analysis.

7.0 Conclusion

All organizations use projects as the way to translate strategies into actions and objectives into realities. The art of managing projects is about having consistency in achieving stated objectives within limits of time, budget, and stakeholders' satisfaction, by directing and coordinating human and material resources. In order to remain competitive in this fast changing telecom market, it is essential for BSNL to use project management techniques.

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