Module 5

Project Management

Introduction to Network analysis: Project Management

Network analysis is a system which plans the projects by analyzing the project activities.

Projects are broken down into individual tasks or activities, which are arranged in logical sequence. It is also decided that which tasks will be performed simultaneously and which other sequentially.

A network diagram is prepared, which presents visually the relationship between all the activities involved and the cost for different activities. Network analysis helps designing, planning, coordinating, controlling and in decision-making in order to accomplish the project economically in the minimum available time with the limited available resources. The network analysis fulfils the objectives of reducing total time, cost, idle resources, interruptions and conflicts.

Managerial applications of network analysis are as follows:

1. Assembly line scheduling,
2. Research and development,
3. Inventory planning and control,
4. Shifting of manufacturing plant from one site to another,
5. Launching of new products and advertising campaigns,
6. Control of traffic flow in cities,
7. Budget and audit procedures,
8. Launching space programmes,
9. Installation of new equipment,
10. Long-range planning and developing staffing plans, etc.

Network techniques:

A number of network techniques, given below have been developed in recent times:

1. PERT- Programme Evaluation and Review Technique
2. CPM- Critical Path Method
3. RAMS- Resource Allocation and Multi-project Scheduling
4. PEP- Programme Evolution Procedure

5. COPAC- Critical Operating Production Allocation Control
6. MAP- Manpower Allocation Procedure
7. RPSM- Resource Planning and Scheduling Method
8. LCS- Least Cost Scheduling
9. MOSS- Multi-Operation Scheduling System
10. PCS- Project Control System
11. GERT- Graphical Evaluation Review Technique.

CPM & Pert (Definition)

Definition of PERT

PERT is an acronym for Program (Project) Evaluation and Review Technique, in which planning, scheduling, organizing, coordinating and controlling uncertain activities take place. The technique studies and represents the tasks undertaken to complete a project, to identify the least time for completing a task and the minimum time required to complete the whole project. It was developed in the late 1950s. It is aimed to reduce the time and cost of the project.

PERT uses time as a variable which represents the planned resource application along with performance specification. In this technique, first of all, the project is divided into activities and events. After that proper sequence is ascertained, and a network is constructed. After that time needed in each activity is calculated and the critical path (longest path connecting all the events) is determined.

Definition of CPM

Developed in the late 1950s, Critical Path Method or CPM is an algorithm used for planning, scheduling, coordination and control of activities in a project. Here, it is assumed that the activity duration is fixed and certain. CPM is used to compute the earliest and latest possible start time for each activity.

The process differentiates the critical and non-critical activities to reduce the time and avoid the queue generation in the process. The reason for the identification of critical activities is that, if any activity is delayed, it will cause the whole process to suffer. That is why it is named as Critical Path Method.

In this method, first of all, a list is prepared consisting of all the activities needed to complete a project, followed by the computation of time required to complete each activity. After that, the dependency between the activities is determined. Here, ‘path’ is defined as a sequence of activities in a network. The critical path is the path with the highest length.

Comparison of CPM and PERT

Comparison Chart

BASIS FOR COMPARISON	PERT	CPM
Meaning	PERT is a project management technique, used to manage uncertain activities of a project.	CPM is a statistical technique of project management that manages well-defined activities of a project.
What is it?	A technique of planning and control of time.	A method to control cost and time.
Orientation	Event-oriented	Activity-oriented
Evolution	Evolved as a Research & Development project	Evolved as Construction project
Model	Probabilistic Model	Deterministic Model
Focuses on	Time	Time-cost trade-off
Estimates	Three-time estimates	One time estimate
Appropriate for	High precision time estimate	Reasonable time estimate
Management of	Unpredictable Activities	Predictable activities
Nature of jobs	Non-repetitive nature	Repetitive nature
Critical and Non-critical activities	No differentiation	Differentiated
Suitable for	Research and Development Project	Non-research projects like civil construction, shipbuilding, etc.

BASIS FOR COMPARISON	PERT	CPM
Crashing concept	Not Applicable	Applicable

The most important differences between PERT and CPM are provided below:

1. PERT is a project management technique, whereby planning, scheduling, organising, coordinating and controlling uncertain activities are done. CPM is a statistical technique of project management in which planning, scheduling, organising, coordination and control of well-defined activities take place.
2. PERT is a technique of planning and control of time. Unlike CPM, which is a method to control costs and time.
3. While PERT is evolved as a research and development project, CPM evolved as a construction project.
4. PERT is set according to events while CPM is aligned towards activities.
5. A deterministic model is used in CPM. Conversely, PERT uses a probabilistic model.
6. There are three times estimates in PERT, i.e. optimistic time (to), most likely time ™, pessimistic time (tp). On the other hand, there is only one estimate in CPM.
7. PERT technique is best suited for a high precision time estimate, whereas CPM is appropriate for a reasonable time estimate.
8. PERT deals with unpredictable activities, but CPM deals with predictable activities.
9. PERT is used where the nature of the job is non-repetitive. In contrast to, CPM involves the job of repetitive nature.
10. There is a demarcation between critical and non-critical activities in CPM, which is not in the case of PERT.
11. PERT is best for research and development projects, but CPM is for non-research projects like construction projects.
12. Crashing is a compression technique applied to CPM, to shorten the project duration, along with the least additional cost. The crashing concept is not applicable to PERT.