

**TEACHING MANUAL**

# **Project Management**

**HEM-301**



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## **Declaration**

The E-compendium is designed according to the syllabus offered in under graduate degree programme for the students of Extension Education and Communication Management, College of Community Science, RPCAU, Pusa. The content of this document is prepared with the help of various text books, resource materials and various sources from material available online. The author does not claim for originality of work. The e-manual is meant to be used for practicals as a reference material for the students of College of Community Sciences, RPCAU, Pusa for the academic purpose of understanding the course.

**HEM-301    Project Management                      3(2+1)**  
**Objective**

**V**

- To acquaint the students with the project management techniques

**Theory**

Project management: Overview. Project- meaning, concept, types, elements of management. Project proposal-concept, designing, project initiation, resource allocation framework, Market and demand analysis. Environmental appraisal of projects, environmental impact analysis, Technical analysis, Financial analysis. Budgeting Terminology of networks. Project management techniques.

**Practical**

Collection and screening of case studies on project management and report writing, visit to project-Technology generation Project. Visit to Project-Transfer of Technology (TOT). Visit to Project- Women entrepreneurship. Visit to state level and international level funding agencies. Visit to International funded projects. Visit to women and child development project. Visit to agriculture development project, visit to rural development projects. Designing, planning and preparation of a mini project proposal. Working on project management techniques: PERT. Working on project management: CPM. Working on project management techniques: WBS. Report writing.

<b>Sl. No.</b>	<b>Course Outline</b>	<b>No. of classes</b>
1	Project management: Overview. Project - meaning, concept, types, elements of management	4
2	Project proposal- concept, designing	4
3	project initiation, resource allocation framework	4
4	Market and demand analysis.	4
5	Environmental appraisal of projects, Environmental impact analysis,	2
6	Technical analysis,	2
7	Financial analysis.	2
8	Budgeting Terminology of networks.	4
9	Project management techniques.	2
	<b>Mid-term Examination</b>	<b>2</b>
	<b>Total</b>	<b>30</b>

<b>Sl. No.</b>	<b>Practical; Course Outline</b>	<b>No. of classes</b>
1	Collection and screening of case studies on project management and report writing,	2
2	Visit to project - Technology generation project.	1
3	Visit to Project - Transfer of Technology (ToT).	1
4	Visit to Project- Women entrepreneurship.	1
5	Visit to state level and international level funding agencies.	1
6	Visit to International funded projects.	1
7	Visit to women and child development project.	1
8	Visit to agriculture development project,	1
9	Visit to rural development projects.	1
10	Designing, planning and preparation of a mini project proposal.	2
11	Working on project management techniques: PERT & CPM	3
12	Working on project management techniques: WBS.	2
13	Report writing	3
	<b>Practical Examination</b>	<b>1</b>
	<b>Total</b>	<b>21</b>
	<b>Grand Total</b>	<b>51(30+21)</b>

#### **Distribution of marks**

Mid-term Examination	15
Quiz	10
Class Practical and Practical Examination	25
Final Examination	50

#### ***Suggested Reading:***

1. Soni V.(2010) *Fundamentals of Computer*, Himalaya Publishing House
2. Tanenbaum, Andrew S (2011), *Computer Networks*, Person Education, Inc. and Dorling Kidersley Publishing Inc.
3. Kundu Sudakshina (2008), *Fundamentals of computer networks*, Prentice-Hall of India Private Ltd., New Delhi.
4. Dey, Sukhendu, Dutta, Deborata (2010), *Complete knowledge Inc. Narosa Publishing house Pvt. Ltd.*

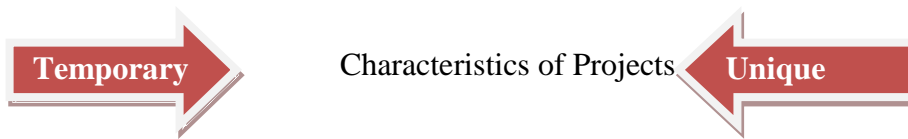
5. *Chatfield, Carl, Johnson, Timonthy (2004), Microsoft Office Project 2003 step by step, prentice-Hall of India Pvt. Ltd., New Delhi.*

## Lecture-1

### PROJECT MANAGEMENT: OVERVIEW. PROJECT - MEANING, CONCEPT, TYPES, ELEMENTS OF MANAGEMENT

#### Meaning of Project:

- A Project is a temporary endeavor undertaken to produce a unique product or services



- **Temporary**-Definitive beginning and end
- **Unique**-New undertaking, unfamiliar ground

A **project** is a [temporary] sequence of unique, complex, and connected activities having one goal or purpose and that must be completed by specific time, within budget, and according to specification.

#### Project Definition

- ❖ Project in general refers to a new endeavor with specific objective and varies so widely that it is very difficult to precisely define it. Some of the commonly quoted definitions are as follows. Project is a temporary endeavor undertaken to create a unique product or service or result. (AMERICAN National Standard ANSI/PMI99-001-2004)
- ❖ Project is a unique process, consist of a set of coordinated and controlled activities with start and finish dates, undertaken to achieve an objective confirming to specific requirements, including the constraints of time cost and resource. (ISO10006)

Examples of project include

- Developing a watershed,
- Creating irrigation facility,
- Developing new variety of a crop,
- Developing new breed of an animal,
- Developing agro processing centre,
- Construction of farm building, sting of a concentrated feed plant etc.

It may be noted that each of these projects differ in composition, type, scope, size and time.

### **Project Characteristics:**

Despite above diversities, projects share the following common characteristics.

- ❖ Unique in nature.
- ❖ Have definite objectives (goals) to achieve.
- ❖ Requires set of resources.
- ❖ Have a specific time frame for completion with a definite start and finish.
- ❖ Involves risk and uncertainty.
- ❖ Requires cross-functional teams and interdisciplinary approach.

### **Management:**

Management is the technique of understanding the problems, needs and controlling the use of Resources, Cost, Time, Scope and Quality.

According to Harold Koontz, - Management is an art of getting things done through and with the people in formally organized groups. It is an art of creating an environment in which people can perform and individuals and can co-operate towards attainment of group goals.

### **Project Management:**

Project management is the discipline of planning, organizing and managing resources to bring about the successful completion of specific project goals and objectives.

**Project management** is the process of scoping, planning, staffing, organizing, directing, and controlling the development of an acceptable system at a minimum cost within a specified time frame.

**Project management** is the discipline of organizing and managing resources in such a way that these resources deliver all the work required to complete a project within defined scope, time, and cost constraints.

A successful project management can therefore be defined as having achieved the project objectives like; within the time limit, within estimated cost, desired performance/technology level, and utilized the assigned resources effectively and efficiently.

### **Purpose of Project Management**

- To handle projects effectively in an organization.
- To define the project and agree with the customer

- To plan and assess resource needs for the project
- To estimate project cost and make proposals
- To plan & schedule activities in a project.
- To allocate the right resource at the right time.
- To assess risk and failure points and make backup plans.
- To lead a project team effectively and communicate well among team members.



## Lecture-2

### Types of Projects

The projects can be classified into various types:

#### 1) Based on Ownership

- a) **Public Projects:** These are the projects which are done by public projects. E.g. Construction of Roads & Bridges, Adult Education Programmes, etc.
- b) **Private Projects:** These are the projects which are undertaken by private enterprises. E.g. any business related projects such as a construction of houses by real estate builders, software development, marriage contracts, etc.
- c) **Public Private Partnerships:** These projects which are undertaken by both government and private enterprises together. E.g., Generation of Electricity by Windmill, Garbage Collection, etc.

#### 2) Based on Investment

- a) **Large Scale Project:** These projects involve a huge outlay or investments, say, crores. E.g. Real Estate Projects, Road Construction of manufacturing facilities, Satellite sending projects of ISRO, Unique Identification Number project of India, etc.
- b) **Medium Scale Project:** These projects involve medium level investment and are technology oriented. Example: Computer industry and electronic industry.
- c) **Small Scale Project:** These projects involve only a lesser investments. E.g., agricultural projects, manufacturing projects

#### 3) Based on Research in Academia

- a) **Major Projects:** In academia, the major projects are those projects which involve more than one year to 3 or 5 years and minimum funding of ` 3 lakhs in case of social sciences and ` 5 lakh in case of sciences.
- b) **Minor Projects:** The minor projects in academia are those projects which will be completed within a year and have a maximum funding of ` 1 lakh in social science and ` 3 lakh in case of sciences.

#### 4) Based on Sector

- a) **Agricultural Projects:** These are the projects which are related to agricultural sector like irrigation projects, well digging projects, manuring projects, soil upgrading project, etc
- b) **Industrial Projects:** These are the projects which are related to the industrial manufacturing sectors like cement industry, steel industry, textile industry, etc. For example, technology transfer project, marketing project, capital issue project like IPO, etc.
- c) **Service Projects:** These are the projects which are related to the services sectors like education, tourism, health, public utilities, etc. For example, adult literacy project, medical camp, general health check up camp, etc.

#### 5) Based on Objective

- a) **Commercial Projects:** These projects are undertaken for commercial purpose and return on investment is expected out these projects. For example, Toll roads based on BOLT – Build Own Lease Transfer Model or BOOT – Build Own Operate and Transfer Model, Product Launching project.
- b) **Social Projects:** These projects are undertaken for social purposes and welfare of the people is the aim of these projects. These projects are undertaken either by the Government or Service oriented NonGovernmental Organizations. For example, Polio immunization Project, Child Welfare Projects, Adult Literacy Projects, etc

#### 6) Based on Nature

- a) **Conventional Projects:** These projects are traditional projects which do not apply any innovative ideas or technology or method. For example, conventional irrigational projects, handicraft projects, etc.
- b) **Innovative Projects:** These projects involve the use of technology, high R&D, development of new products and services. These innovative projects can be further classified into

**I. Technology:** Depending on the level of technological uncertainty at the time of initiation of projects, the projects can be classified into:

**Low-Tech** projects which rely on the existing and well established base technologies;

**Medium**-Tech projects which rest mainly on existing base technologies but incorporate some new technology or feature;

**High**-Tech projects in which most of the technologies employed are new, but existent, having been developed prior to the project's initiation; and Super HighTech projects which are based primarily on new, not entirely existent technologies.

II. **Research:** Based on the type of research, projects can be classified into:

**Exploratory research projects** which may generate novel idea in the domain of knowledge; **constructive research** projects which are mainly done by many technological corporate to find new or alternative solutions to any particular crisis or problems, e.g., renewable energy research or development of the capacity of optical fiber; and **Empirical research projects** are very impressive observational type of research in which testing on real life data or analysis of pattern of some specific events in order to identify the nature or the class of trend that specific phenomenon maintains.

#### 7) **Based on Time**

- a. Long term projects: These projects take a very long duration to complete. These projects are run for many years till the objective is reached. For example, Eradication of diseases like Polio, Filariasis, etc.
- b. Medium term projects: These projects take medium term duration like 3 to 5 years. For example, Modernization projects, computerization of operations, etc.
- c. Short term projects: These projects are executed within a short period, normally within a year. For example, Pond cleaning project, health camps, software development, etc.
- d. Very short term projects: By very name you can understand that these projects are completed within a very short period, say, within a day. For example, product launch project.

#### 8) **Based on Functions**

Based on the functional area of management, the projects can be classified into:

- a) Marketing Projects which are taken up in the area of marketing a product or service of an organization. Marketing road shows, implementing a marketing strategy, etc.

b) Financial Projects are undertaken to raise finance or restructure capital structure. For example, IPO Project, share split project, etc.

c) Human Resources Projects are undertaken in the area of human resources of an organization, e.g., Induction training project, campus recruitment project, etc.

d) IT and Technology Projects which are undertaken in the area of IT companies or IT related requirement of any organization, e.g., development of Human Resources Information System, Marketing Information System, etc.

e) Production Projects are undertaken in the area of production or operations. For example, overhauling projects, preventive maintenance projects, getting an ISO certification, etc.

f) Strategic Projects are taken by the organizations to executive a strategy, for example, mergers and acquisition projects, Core Banking Solution project introduced in banks, etc.

#### **9) Based on Risk**

I. **High Risk Projects:** These projects involve a very high degree of risk, for example, nuclear energy project, thermal energy project, satellite projects, etc. If the project is not handled properly, the effect will be very adverse. Thus, high precautionary measures are to be taken to commission these projects.

II. **Low Risk Projects:** These projects do not involve risk and they are carried out in the normal course of action. For example, road and bridge construction, house construction.

#### **10) Based on Investment Decisions**

On the basis how the projects influence the investment decision products, project can be classified into

a. **Independent Projects:** An independent project is one, where the acceptance or rejection does not directly eliminate other projects from consideration or affect the likelihood of their selection. For example, if management plans to introduce a new product line, as well as, replace a machine which is currently producing a different product. These two projects can be considered independent of each other, if there are sufficient resources to adopt both, provided, they meet the firm's investment criteria.

- b. **Mutually exclusive Projects:** The mutually exclusive projects are projects that cannot be followed at the same time. The acceptance of one prevents the substitute proposal from accepting. Most of them have 'either or' decisions. You will not be able to follow more than one project at the same time. The evaluation is done on a separate basis so that one that brings the highest value to the company is chosen.
- c. **Contingent Projects:** A contingent project is one where the acceptance or rejection depends on the decision to accept or reject multiple numbers of other projects. Such projects may be complementary or substitutes. Let us take the example of bio fuel plant cultivation in a large scale and the decision to set up a bio fuel manufacturing unit. In this case, the projects are complementary to each other. The cash flows of the plant cultivation will be enhanced by the existence of a nearby manufacturing plant. Conversely, the cash flows of the manufacturing unit will be enhanced by the existence of a nearby cultivation farm.

#### **11) Based on Output**

- a. **Quantifiable projects:** In these projects, the benefits / goals of which are amenable for measurement. Quantitative expression of the outcomes is possible. It is easy to understand and appreciate quantitative projects as it is easy to communicate them. For instance, enterprises engaged in the production of various goods and services come under this category.
- b. **Non-quantifiable projects:** In these projects quantification of the benefits / outcome may not always be possible as the impact of the project is spread over a longer period. The benefits accrue to the intended beneficiaries in the long run. Projects concerning health, education, and environment fall under this category.

#### **12) Based on Financial Institutions' Classification**

Financial institutions – both central and state level have classified projects into profit-oriented projects and service-oriented projects.

- a) **Profit-Oriented Projects:** They are classified into
  - a) New Projects; b) Expansion Projects or Development projects; c) Modernization Projects or Technology Projects and d) Diversification Projects.

**b) Service-Oriented Projects:** They are classified into a) Welfare Projects; b) Service Projects; c) Research and Development Projects and d) Educational Projects.

## **Lecture-3**

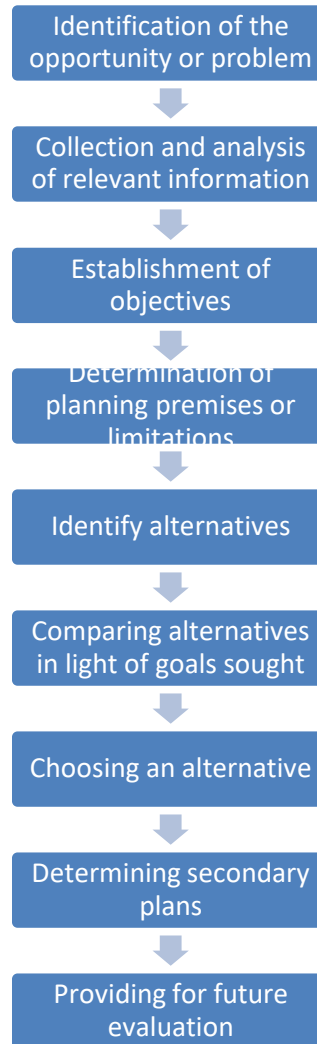
### **Elements of Management**

The basic components or elements of management include

- I. Planning**
- II. Organizing**
- III. Staffing**
- IV. Directing:**
- V. Controlling**

#### **I. Planning:**

Planning is the beginning of all the other processes of management-organizing, staffing, directing, communication and control. Planning is deciding in advance what to do, how to do, when to do and who is to do it. Planning bridges the gap from 'where we are' to 'where we want to go' (Koontz and O'Donnell). In the words of Theo Haimann, "Planning is the function that determines in advance what should be done. It consists of selecting the enterprise objectives, policies, programmes, procedures and other means of achieving their objectives.



### **Steps in Planning Process:**

### **Nature of planning**

- It is the primary function of management
- It is beginning of the process of management.
- It is an intellectual process which requires a manager to think before acting.
- It must be flexible
- It is an all pervasive function
- Based on objectives and policies
- Selective process
- Directed towards the efficiency
- Concerns with the future activities



- Based on facts

### **Importance of planning**

- Minimizes risk and uncertainty
- Leads to success
- Focuses attention on the organization's goals
- Facilitate control
- Minimize the cost of performance
- Improving the competitive strength

## **II. Organizing:**

Organization means a system with parts which work together, or system with parts dependent upon each other.

**According to Louis Allen**, organization is a process of identifying and grouping the work to be performed, defining and delegating responsibility and authority, and establishing relationships for the purpose of enabling people to work most effectively together in accomplishing objectives.

**According to Henry Fayol**,:- To organize a business is to provide it with everything useful or its functioning i.e. raw material, tools, capital and personnel's. To organize a business involves determining & providing human and non-human resources to the organizational structure.

Organizing as a process involves:

1. Identification of activities.
2. Classification of grouping of activities.
3. Assignment of duties.
4. Delegation of authority and creation of responsibility.
5. Coordinating authority and responsibility relationships.

### **Steps in Organizing**

- Consideration of objectives
- Grouping of activities into departments
- Deciding which departments will be key departments
- Determining levels at which various types of decisions are to be made
- Determining the span of management
- Setting up a coordination mechanism

### III. **Staffing:**

Staffing is the process of deciding the number and quality of manpower needed by an organization. To achieve its objectives efficiently recruiting, selecting, training, developing and appraising the newly recruited as well as the existing staff is the main focus of the unit. It can be seen as the function of “Human Resource Manager” but at a very smaller level.

**According to Koontz & O'Donell:** - Managerial function of staffing involves manning the organization structure through proper and effective selection; appraisal & development of personnel to fill the roles designed the structure.

Staffing involves:

1. Manpower- Planning (estimating man power in terms of searching, choose the person and giving the right place).
2. Recruitment, Selection & Placement.
3. Training & Development.
4. Remuneration.
5. Performance Appraisal.
6. Promotions & Transfer.

### IV. **Directing:**

Directing is primarily concerned with supervision, regulation, inspiration, inspection and guidance of the activities of the employees in such a manner so as to achieve the pre-determined goals of the organization smoothly. Direction is that inert-personnel aspect of management which deals directly with influencing, guiding, supervising, motivating sub-ordinate for the achievement of organizational goals.

Direction has following elements:

1. Supervision
2. Motivation
3. Leadership
4. Communication

Supervision- implies overseeing the work of subordinates by their superiors. It is the act of watching & directing work & workers.

Motivation- means inspiring, stimulating or encouraging the sub-ordinates with zeal to work.

Positive, negative, monetary, non-monetary incentives may be used for this purpose. Leadership- may be defined as a process by which manager guides and influences the work of subordinates in desired direction.

Communications- is the process of passing information, experience, opinion etc from one person to another. It is a bridge of understanding

## **V. Controlling**

Control means the power or authority to direct, order or restrain. In the context of an enterprise, control may be defined as “comparing operating results with the plans, and taking corrective action when results deviate from the plans”

**According to Theo Haimann:** - Controlling is the process of checking whether or not proper progress is being made towards the objectives and goals and acting if necessary, to correct any deviation.

**According to Koontz & O Donell:-** Controlling is the measurement & correction of performance activities of subordinates in order to make sure that the enterprise objectives and plans desired to obtain them as being accomplished. Therefore controlling has following steps:

- a. Establishment of standard performance.
- b. Measurement of actual performance.
- c. Comparison of actual performance with the standards and finding out deviation if any
- d. Corrective action.

The main objective of controlling is to bring to light the variations between the standards set and performance and then to take necessary steps to prevent the occurrence of such variations in future.

## Lecture-4

### **Project Proposal-Concept, Designing, Project Initiation, Resource Allocation Framework, Market and Demand Analysis.**

#### **Project proposal – Meaning**

**PROPOSAL** - Is a request for financial assistance to implement a project. - It outlines the plan of the implementing organization about the project, giving extensive information about the intention, for implementing it, the ways to manage it and the results to be delivered from it

#### **PROJECT PROPOSAL**

- ❖ Project Proposal is a document which you present to potential sponsors or clients to receive funding or get your project approved. – It is a detailed description of a series of activities aimed at solving a certain problem.
- ❖ A project plan is a formal, approved document that is used to manage and control a project.
- ❖ Project planning defines the project activities and end products that will be performed and describes how the activities will be accomplished.
- ❖ The purpose of project planning is to define each major task, estimate the time and resources required, and provide a framework for management review and control.
- ❖ A project proposal is a **detailed description of a series of activities** aimed at solving a certain problem.

The proposal should contain a detailed explanation of the:

- Justification of the project;
- Activities and implementation timeline;
- Methodology; and
- Human, material and financial resources required.

#### **Formulation of project plan**

Project formulation is the systematic development of a project idea for arriving at an investment decision. It has the built-in mechanism of ringing the danger bell at

the earliest possible stage of resource utilization.

Project formulation is a process involving the joint efforts of a team of experts. Each member of the team should be familiar with the broad strategy, objectives & other ingredients of the project. Besides being an expert in his area of specialization, he should be able to play his role in the overall scheme of things. It aims at a systematic analysis of project potential with the ultimate objective of arriving at an investment decision. In this process it makes an objective assessment from all possible angles starting from project identification up to its appraisal stage. Thus, project formulation is the process of examining technical, economic, financial & commercial aspects of a project. It refers to a preliminary project analysis covering all aspects such as technical, financial, commercial, economic & managerial to find out whether it is worthwhile to take project for detailed investigation & evaluation.

### **Phases of Project**

An entrepreneur has to consider various factors from the start to the finish in converting profitable opportunities into realities. The phases of project may be divided into six broad phases — identification, formulation, appraisal, selection, implementation, and management of projects.

#### **1 Identification**

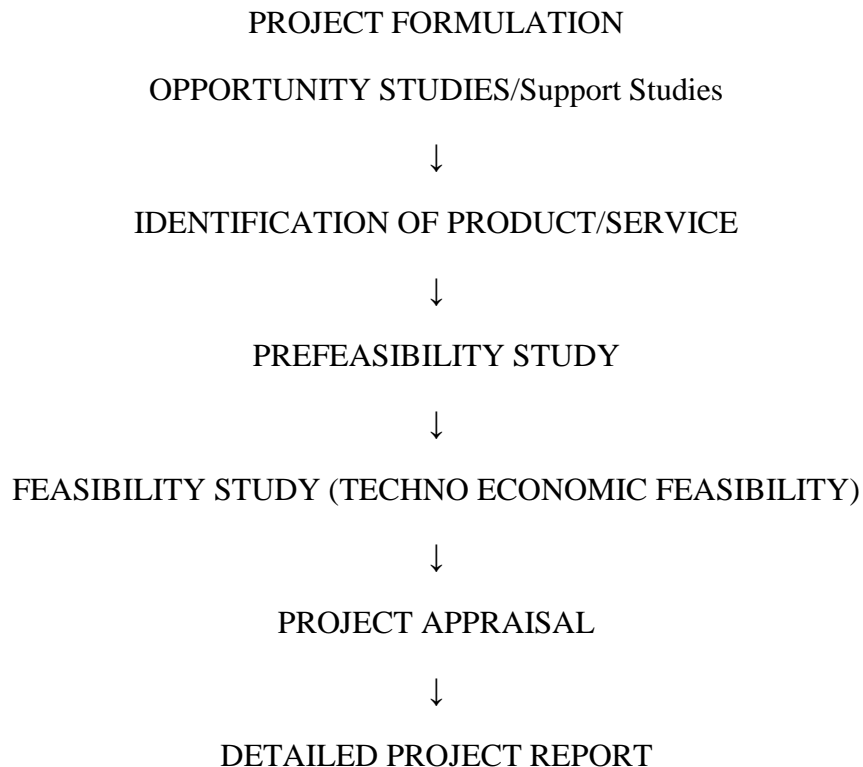
Project identification is an important step in project formulation. These are conceived with the objective of meeting the market demand, exploiting natural resources or creating wealth. The project ideas for developmental projects come mainly from the national planning process, whereas industrial projects usually stem from identification of commercial prospects and profit potential.

As projects are a means to achieving certain objectives, there may be several alternative projects that will meet these objectives. It is important to indicate all the other alternatives considered with justification in favor of the specific project proposed for consideration.

#### **2. Formulation**

“Project Formulation” is the processes of presenting a project idea in a form

in which it can be subjected to comparative appraisals for the purpose of determining in definitive terms the priority that should be attached to a project under severe resource constraints.



**Figure1. Project Formulation –Schematic view**

**Opportunity Studies:** An opportunity study identifies investment opportunities and is normally undertaken at macro level by agencies involved in economic planning and development. In general opportunity studies there are three types of study – Area Study, sectorial and Sub-sectorial Studies and Resource Based Studies. Opportunity Studies and Support studies provide sound basis for project identification.

**3. *Appraisal***

Searching scrutiny, analysis and evaluation of market. technical, financial and economic variables. Assessing the profitability, return on investment and break-even points.

**4. *Selection***

Rational choice of a project in the light of objectives and inherent constraints.

5. **Implementation**

Expeditious completion within the allocated resources.

6. **Management**

Judicious operation of a project/enterprise with objectives like maximization of net present value, maximization of return, and increase in the rate of return at low risk

**Stages of Project Formulation**

The project formulation starts with an explanation of the nature and purpose of the problem and passes through the following stages.

- 1) Feasibility Analysis
  - 2) Techno-Economic Analysis
  - 3) Project Design and Network Analysis
  - 4) Input analysis
  - 5) Financial Analysis.
  - 6) Social Cost Benefit Analysis
  - 7) Pre-investment Analysis
- 1) **Feasibility Analysis:** This Analysis is undertaken to ascertain the desirability of investing funds in the development of a project idea. In other words, the project idea is examined in the context of different constraints. At this stage, there could be three alternatives, via
    - a) The project idea seems to be feasible
    - b) The project idea is not feasible
    - c) Unable to arrive at a conclusion- (If the Project idea seems to be feasible, we proceed to the second step. If the project idea is not feasible, we abandon the idea).
  - 2). **Techno-Economic Analysis:** At this level, project demand potential is estimated and choice of optimal technology is made. Market analysis is also an important step in this stage.
  - 3). **Project Design and Network Analysis:** This step defines individual activities which constitute the project and their relationship with each other.

- 4) **Input Analysis:** The input requirements during the construction of the project are assessed at this step. Input assessment will help in assessing the cost of the project which in turn is essential for financial analysis.
- 5) **Financial Analysis:** Financial analysis seeks to examine whether the proposed project will be financially viable and whether the proposed project will satisfy the expected returns.
- 6) **Social Cost Benefit Analysis:** The aim of this analysis is to ascertain all social costs and benefits with the purpose of finding out the impact of the Project on society.
- 7). **Pre-investment Analysis:** The project proposal gets a formal and final shape at this stage, and will decide whether to accept the proposal or not.

From the above case, list out various phases of project formulation.

### **Project finance**

It means the arrangement of sufficient funds to finance a specific project. The ways and means of financing a project will vary from project to project. It depends on the nature, duration and size of the Project.

The sources of project finance may be internal (own fund, accumulated profit and retained earnings in case of existing business) and external (borrowings from banks and financial institutions).

Besides, the entrepreneur can make use of available subsidies and grants- in-aid from government and non-governmental agencies.

The Capital requirements of an entrepreneur can be sub divided into two, such as;

#### **1. Fixed Capital**

#### **2. Working Capital**

1. **Fixed capital:** Capital required to finance fixed assets is called fixed capital. It includes share capital, debentures, long term loans, assistance from foreign financial institutions and subsidies /margin money from promotional agencies.
2. **Working capital:** Capital required to meet the day to day activities of business is termed as working capital. It includes advances and overdrafts from commercial banks, credit



facilities from suppliers, discounting of bills etc.

### **Determinants of working capital**

The requirement of working capital varies from business to business which depends on the following factors.

1. Nature of business: Trading concerns required huge investment in working capital since they have to stock large quantities of finished goods. The requirement of working capital of public utility concern is comparatively lesser.
2. Size of business: Larger the business, larger will be the need for working capital vice versa.
3. Cost and time involved in manufacture (production cycle): If the time taken to manufacture is more the need for working capital will also be more.
4. Terms of purchase and sales: If a concern would be able to sell its products on cash basis and make its purchases on credit basis, the requirement of working capital will be lesser.
5. Turnover of working capital: If the time taken for conversion is more working capital required will also be more.
6. Trade cycle (business cycle-boom/prosperity, recession, depression and recovery): During depression, more working capital is required compared to boom period.
7. Liquid current assets: If the current assets are highly liquid the working capital requirement will be less.
8. Other factors: – Absence of banking relationships, absence of transport facilities etc. will result in more working capital.

### **Concept of Working Capital**

There are two concepts of working capital:

1. Gross Working Capital Concept: According to this concept working capital is the total of current asset.
2. Net working capital concept: According to this concept working capital is the difference between Current assets and current liabilities.

Current assets are those assets which are converted into cash within one year. Examples of current assets are cash in hand, cash at bank, stock, bills receivable, debtors, etc. Current

liabilities are those liabilities which are payable within a period of one year. Examples are Bank overdraft, sundry creditors, bills payable, outstanding expenses, etc.

### **Sources of finance**

#### *1. Long Term finance*

This source is needed for acquiring fixed assets like land and building, plant and machinery, furniture and fixtures etc. Sources of long term financing may be issue of shares, issue of debentures, assistance from foreign financial institutions, loans from special financial institutions like KFC, IDBI subsidy from pro-motional agencies, etc.

#### *2. Medium term finance*

Medium term funds are usually required for a period ranging from 5 to 10 years. Sources of medium term funds are: issue of redeemable debentures, loans from commercial banks and other financial institutions.

#### *3. Short term finance*

This is required for financing working capital requirements. This fund is invested in current assets like cash in hand, debtors, inventories, cash at bank, bill receivables, short term investments etc. The sources for finding short term finance are:

- Advances and overdrafts from commercial banks
- Credit facilities from suppliers
- Installment credit
- Discounting of bills

### **Types of cost**

- 1. Fixed cost:** Those costs which do not change with changes in the volume or level of activity within the limit of plant capacity. E.g.: Rent of business premises, insurance, depreciation, taxes, salary of executives etc.
- 2. Variable cost:** Cost which tends to vary directly with variation in the volume of output. It varies in direct proportion to the volume of production. Variable cost per unit remains the same at all levels of activity. e.g.: direct material, direct labor. Variable costs are also referred as product cost.
- 3. Total cost:** It is the total of all implicit and explicit costs incurred for producing a certain

product. It represents the money value of all resources sacrificed for producing goods and services. It includes fixed costs and variable cost.

4. **Average cost:** It is the cost per unit of output. It is obtained by dividing the total cost by the total number of units produced.
5. **Marginal cost:** It is the extra cost incurred for producing an extra unit of output. It is the cost of marginal unit produced.

**Marginal cost = Change in Total Cost / Change in Unit**

### Break Even Analysis

It is a method of cost volume profit analysis widely used in practice. It is used in two senses- in narrow sense and in broad sense. In narrow sense, it refers to a technique of determining that level of operation where total revenue is equal to the total expenses. It is the technique of determining the no profit no loss point. In its broad sense, breakeven analysis refers to the study of relationship of cost-volume and profit at different levels of activities.

### Breakeven point

It may be defined as that point of sales volume at which total revenue is equal to total cost. It is the point of no profits no loss.

Breakeven point can be stated in the form of an equation

**Breakeven point (in sales) = Fixed cost / Profit Volume (PV) Ratio**

**Ratio = Contribution / Sales × 100**

Breakeven point in units = fixed cost / contribution per unit or breakeven sales / selling price per unit  
Contribution is the difference between sales and variable cost of sales or it is the total of fixed cost and profit.

Sales = Total cost + profit

Total cost = fixed cost + variable cost

Therefore, sales = Fixed cost + variable cost + profit

Sales - variable cost = fixed cost + profit = contribution

Contribution = sales - variable cost or fixed cost + profit

PV ratio = Contribution / sales × 100 or

Contribution and profit statement	
Sales	***
Less Variable cost	*** ---
Contribution	***
Less Fixed cost	*** ---

## Lecture-5

### Market and demand analysis

The first step in project analysis is to estimate the potential size of the market for the product proposed to be manufactured (or service planned to be offered) and get an idea about the market share that is likely to be captured.

An in-depth study and assessment of various factors like patterns of consumption growth, income and price elasticity of demand, composition of market, nature of competition, availability of substitutes, reach of distribution channels etc. are included in it.

Market and demand analysis, should be carried out in an orderly and systematic manner. The key steps in such analysis are as follows:

- ❖ Situational analysis and specification of objectives
- ❖ Collection of secondary information
- ❖ Conduct of market survey
- ❖ Characterization of the market
- ❖ Demand forecasting
- ❖ Market planning

#### **Situational analysis and specification of objectives**

In order to get a “feel” for the relationship between the product and its market, the project analyst may informally talk to customers, competitors, middlemen, and others in the industry to learn about the preferences and purchasing power of customers, actions and strategies of competitors, and practices of the middlemen.

To carry out a study, it is necessary to spell out its goals and objectives clearly and comprehensively.

Example: To develop multi grain flour based on a new principle that appears to offer several advantages over the ordinary wheat flour. The chief executive of the firm needs information about where and how to market the multigrain flour.

The objectives of market and demand analysis in this case may be to answer the following questions:

- Who are the buyers?
- What is the total current demand for ordinary wheat flour?
- How is the demand distributed temporally (pattern of sales over the year) and geographically?
- What is the break – up of demand for multigrain flour of different proportions?
- What price will the customers be willing to pay for the multigrain flour?
- How can potential customers be convinced about the superiority of the multigrain flour?
- What price will ensure its acceptance?
- What channels of distribution are most suited for the multigrain flour? What trade margins will induce distributors to carry it?
- What are the prospects of immediate sales?

### **Collection of secondary information**

Secondary information is information that has been gathered in some other context and is already available. Primary information, on the other hand, represents information that is collected for the first time to meet the specific purpose on hand. Secondary information provides the base and the starting point for market and demand analysis. It indicates what is known and often provides leads and cues for gathering primary information required for further analysis.

#### *General sources of secondary information*

The important sources of secondary information useful for market and demand analysis in India are mentioned below:

#### **I. Census of India**

A decennial publication of the government of India, it provides, inter alia, information on population, demographic characteristics, household size and composition, and maps.

#### **I. National sample survey reports**

Issued from time to time by the Cabinet Secretariat, Government of India, these reports present information on various economic and social aspects like patterns of consumption, distribution of households by the size of consumer expenditure, distribution of industries, and characteristics of

the economically active population. The information presented in these reports is obtained from a nationally representative sample by the interview method.

**II. Plan reports**

Issued by the planning commission usually at the beginning, middle, and end of the five year plans, these reports and financial targets, actual outlays, accomplishments etc.

**III. Statistical abstract of the Indian Union**

An annual publication of the Central Statistical Organization, it provides, inter alia, demographic information, estimates of national income, and agricultural and industrial statistics.

**IV. India year book**

An annual publication of the Ministry of Information and Broadcasting, it provides a wide range of information on economic and other aspects.

**V. Statistical year book**

An annual publication of the United Nations, it provides world statistics relating to various aspects like population, demography, gross domestic product, industrial production, international trade, etc.

**VI. Economic survey**

An annual publication of the Ministry of Finance, it provides the latest data on industrial production, wholesale prices, consumer prices, exports, agricultural production, national income, etc.

**VII. Guidelines to industries**

This is an annual publication of the Ministry of Industrial Development.

**VIII. Annual survey of industries**

An annual publication of the central statistical organization, it contains information on various aspects of industry: number of units and state-wise distribution, average number of working days, employment, materials consumption, quantity of products, etc.

**IX. Annual reports of the development wing, ministry of commerce and industry**

An annual publication, it gives a detailed review of industries under the purview of the wing. It also provides information about new items manufactured for the first time in India and the list of protected industries.

**X. Annual bulletin of statistics of exports and imports**

An annual publication of the Ministry of commerce, it provides data on imports and exports for a very large number of items and as per international classification.

**XI. Techno economic surveys**

The national council of Applied Economic Research has conducted and published techno-economic surveys for various states.

**XII. Industry potential surveys**

The industrial development bank of India in consortium with other financial institutions has conducted and published industrial potential surveys for several backward areas.

**XIII. The stock exchange directory**

This directory, published by the Bombay Stock Exchange, provides a ten-year picture of performance and financial statements for all listed companies and other important companies. It contains very valuable information for comparative analysis. It is periodically updated.

**XIV. Monthly studies of production of selected industries**

A monthly publication of the Central Statistical Organization, it provides all-India data on production, number of units installed, capacity, state-wise break-up, stock level, etc. for several selected industries.

**XV. Monthly bulletin of reserve bank of India**

This provides information on production indices, prices, balance of payment position, exchange rates, etc.

**XVI. Publication of advertising agencies**

The leading advertising agencies like Clarion, McCann and Thompson have published test markers, marketing rating indices of towns of India, consumer index of markets, and other studies which throw valuable light on Indian markets.

**XVII. Other publications**

Among other publications, mention may be made of the following: weekly bulletin of Industrial licenses, Import licenses and export licenses (published by the government of India); studies of the economic division of the state trading corporation; commodity reports and other studies of the Indian Institute of Foreign Trade; studies and reports of export promotion councils and commodity boards; and annual report on currency and finance (issued by the reserve bank of India).

### **Evaluation of secondary information**

While secondary information is available economically and readily (provided the market analyst is able to locate it) its reliability, accuracy, and relevance for the purpose under consideration must be carefully examined. The market analyst should seek to know:

- Who gathered the information? What was the objective?
- When was the information gathered? When was it published?
- How representative was the period for which the information was gathered?
- Have the terms in the study been carefully and unambiguously defined?
- What was the target population?
- How was the sample chosen?
- How representative was the sample?
- How satisfactory was the process of information gathering?
- What was the degree of sampling bias and non-response bias in the information gathered?
- What was the degree of misrepresentation by respondents?
- How accurately was the information edited, tabulated, and analyzed?
- Was statistical analysis properly applied?

### **Conduct of market survey**

Secondary information, though useful, often does not provide a comprehensive basis for market and demand analysis. It needs to be supplemented with primary information gathered through a market survey, specific to the project being appraised.

The market survey may be a census survey or a sample survey. In a census survey the entire population is covered. (The word 'population' is used here in a particular sense.) It refers to the totality of all units under consideration in a specific study. Examples are: all industries using milling machines, all readers of the Economic times.) Census surveys are employed principally for intermediate goods and investment goods when such goods are used by a small number of firms. In other cases, a census survey is prohibitively costly and may also be infeasible.

Due to the above mentioned limitations of the census survey, the market survey, in practice, is typically a sample survey. In such a survey a sample of the population is contacted/ observed and relevant information is gathered. On the basis of such information, inferences about the population may be drawn.

The information sought in a market survey may relate to one or more of the following:



- Total demand and rate of growth of demand
- Demand in different segments of the market
- Income and price elasticity's of demand
- Motives for buying
- Purchasing plans and intentions
- Satisfaction with existing products
- Unsatisfied needs
- Attitudes toward various products
- Distributive trade practices and preferences
- Socio-economic characteristics of buyers

### **Steps in a sample survey**

Typically, a sample survey consists of the following steps:

#### **Define the target population**

The target population may be divided into various segments which may have differing characteristics. For example, all television owners may be divided into three to four income brackets.

#### **Select the sampling scheme and sample size**

There are several sampling schemes: simple random sampling, cluster sampling, sequential sampling, satisfied sampling, systematic sampling, and non-probability sampling. Each scheme has its advantages and limitations. The sample size, other things being equal, has a bearing on the reliability of the estimates – the larger the sample size, the greater the reliability.

#### **Develop the questionnaire**

The questionnaire is the principle instrument for eliciting information from the sample of the respondents. The effectiveness of the questionnaire as a device for eliciting the desired information depends on its length, the types of questions, and the wording of questions.

Developing the questionnaire requires a thorough understanding of the product / service and its usage, imagination, insights into human behavior, appreciation of subtle linguistic nuances, and familiarity with the tools of descriptive and inferential statistics to be used later for analysis. It also requires knowledge of psychological scaling techniques if the same are employed for obtaining information relating to attitudes, motivations, and psychological traits. Industry and

trade market surveys, in comparison to consumer surveys, generally involve more technical and specialized questions.

Since the quality of the questionnaire has an important bearing on the results of market survey, the questionnaire should be tried out in a pilot survey and modified in the light of problems / difficulties noted.

### **Recruit and train the field investigators**

Recruiting and training of field investigators must be planned well since it can be time – consuming. Great care must be taken for recruiting the right kind of investigators and imparting the proper kind of training to them.

### **Obtain information as per the questionnaire**

Respondents may be interviewed personally, telephonically, or by mail for obtaining information. Personal interviews ensure a high rate of response. They are, however, expensive and likely to result in biased response because of the presence of the interviewer. Mail surveys are economical and evoke fairly candid responses. The response rate, however, is often low. Telephonic interviews, common in western countries, have very limited applicability in India because telephone tariffs are high and telephone connections few.

### **Scrutinize the information gathered**

Information gathered should be thoroughly scrutinized to eliminate data which is internally inconsistent and which is of dubious validity. For example, a respondent with a high income and large family may say that he lives in a one – room tenement. Such information, probably inaccurate, should be deleted.

### **Analyze and interpret the information**

After tabulating it as per a plan of analysis, suitable statistical investigation may be conducted, wherever possible and necessary. For purposes of statistical analysis, a variety of methods are available. They may be divided into two broad categories: parametric methods and non-parametric methods. Parametric methods assume that the variable or attribute under study conforms to some known distribution. Non-parametric methods do not presuppose any particular distribution.

Results of data based on sample survey will have to be extrapolated to the target population. For this purpose, appropriate inflationary factors, based on the ratio of the size of the target population to the size of the sample studied, will have to be used.

## Problems

A market researcher in India has to contend with the following problems:

- Heterogeneity of the country
- Multiplicity of languages
- Design of questionnaire

## Characterization of the market

Based on the information gathered from secondary sources and through the market survey, the market for the product / service may be described in terms of the following:

Effective demand in the past and present: To gauge the effective demand in the past and present, the starting point typically is apparent consumption which is defined as:

Production + imports + exports – changes in stock level.

In a competitive market, effective demand and apparent consumption are equal.

Breakdown of demand: To get a deeper insight into the nature of demand, the aggregate (total) market demand may be broken down into demand for different segments of the market. Market segments may be defined by

Nature of product

Consumer Groups

Geographical division

## Price

Price statistics must be gathered along with statistics pertaining to physical quantities. It may be helpful to distinguish the following types of prices: manufacturer's price quoted as FOB (free on board) price or CIF (cost, insurance, and freight) price, landed price for imported goods, average wholesale price, and average retail price.

## Methods of distribution and sales promotion:

The method of distribution may vary with the nature of product. Capital goods, industrial raw materials or intermediates, and consumer products tend to have differing distribution channels.

Further, for a given product, distribution methods may vary. Likewise, methods used for sales promotion (advertising, discounts, gift schemes, etc.) may vary from product to product.

The methods of distribution and sales promotion employed presently and their rationale must be specified. Such a study may explain certain patterns of consumption and highlight the difficulties that may be encountered in marketing the proposed products.

### Consumers:

Consumers may be characterized along two dimensions as follows:

Demographic and sociological	Attitudinal
Age	Preferences
Sex	Intentions
Income	Habits
Profession	Attitudes
Residence	Responses
Social <a href="#">background</a>	

### Supply and competition:

It is necessary to know the existing sources of supply and whether they are foreign or domestic. For domestic sources of supply, information along the following lines may be gathered: location, present production capacity, planned expansion, capacity utilization level, bottlenecks in production, and cost structure.

Competition from substitutes and near-substitutes should be specified because almost any product may be replaced by some other product as a result of relative changes in price, quality, availability, promotional effort, and so on.

### Government policy:

The role of government in influencing the demand and market for a product may be significant. Governmental plans, policies, legislations, and fiats which have a bearing on the market and demand of the product under examination should be spelt out. These are reflected in: production targets in national plans, import and export trade controls, import duties, export incentives, excise duties, sales tax, industrial licensing, preferential purchases, credit controls, financial regulations, and subsidies / penalties of various kinds.

### Demand forecasting

after gathering information about various aspects of the market and demand from primary and secondary sources, an attempt may be made to estimate future demand. A wide range of

forecasting methods are available to the market analyst. These may be divided into three categories: qualitative methods, time series projection methods, and casual methods.

### **Qualitative methods:**

The important qualitative methods are as follows.

- **Jury of executive opinion method:** Very popular in practice, this method calls for the pooling of views of a group of executives on expected future sales and combining them into a sales estimate.
- **Delphi method:** This method involves converting the views of a group of experts, who do not interact face – to – face, into a forecast through an iterative process.
- **Time series projection methods:** These methods generate forecasts on the basis of an analysis of the historical time series. The important time series projection methods are as follows:
  - **Trend projection method:** Very popular in practice, the trend projection method involves extrapolating the past trend onto the future.
  - **Exponential smoothing method:** In exponential smoothing, forecasts are modified in the light of observed errors.
  - **Moving average method:** According to this method, the forecast for the next period represents a simple arithmetic average or a weighted arithmetic average of the last few observations.
- **Casual methods**

More analytical than the preceding methods, causal methods seek to develop forecasts on the basis of cause – effect relationships specified in an explicit, quantitative manner. The important methods under this category are as follows:

  - **Chain ratio method:** A simple analytical approach, this method calls for applying a series of factors for developing a demand forecast.
  - **Consumption level method:** Useful for a product that is directly consumed; this method estimates consumption level on the basis of elasticity coefficients, the important ones being the income elasticity of demand and the price elasticity of demand.
  - **End use method:** Suitable for intermediate products, the end use method develops demand forecasts on the basis of the consumptions coefficient of the product for various uses.
  - **Leading indicator method:** According to this method, observed changes in leading indicators are used to predict the changes in lagging variables.

- **Econometric method:** Perhaps the most sophisticated forecasting tool, the econometric method involves estimating quantitative relationship derived from economic theory.

### **Market planning**

To enable the product to reach a desired level of market penetration, a suitable marketing plan should be developed. Broadly, it should cover pricing, distribution, promotion, and service. The details that need to be hammered out are shown below:

Pricing	Distribution
Ex-factory price Taxes and duties Applicable for the Domestic price Trade margins / Discounts Final price to the Domestic customer Export price	Packaging Transportation Arrangements Channels of Distribution Role of distributors, Wholesalers, and retailers
Promotion	Service
Branding Advertising Personal selling Promotional efforts	Installation User education Warranties After-sales service

## **Lecture -6**

### **Project Management Techniques.**

Various methods, techniques and tools are used for monitoring and evaluation of extension projects. Some of the methodologies which are popular among the project managers are: Critical Path Method (CPM), Programme Evaluation and Review Technique (PERT)

#### **Introduction to Programme Evaluation Review Technique (PERT)**

- PERT was first used in 1957 as a method of planning and controlling the Polaris Missile Programme by Booz, Allen and Hamilton together with U.S. Naval department. The aim was to finish the project two years in advance. PERT describes basic network technique which includes planning, monitoring and control of projects.

- PERT is a very important technique in the field of project management. It is commonly employed for conducting the initial review of a project.

PERT, actually, developed as a research and development planning tool where activity timings could not be estimated with enough certainty.

- PERT can be employed at those places where a project cannot be easily defined in terms of time or resources required.

PERT is mainly concerned with event and thus it is an event-oriented system.

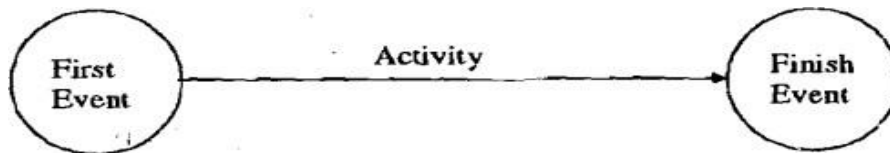
- The basic tools used in PERT technique are the network or flow plan. Network consists of series of related events and activity.

#### **The PERT planning technique consists of the following steps:**

1. The project is broken down into different activities.
2. Activities are arranged in logical sequence.
3. The network diagram is drawn. Events and activities are numbered.
4. Using three times estimate, the expected time for each activity is calculated.
5. Standard deviation and variance for each activity are computed.

6. Earliest starting times and latest finishing times are calculated.
7. Expected time, earliest starting time, and latest finishing times are marked on the network diagram.
8. Slack is calculated.
9. Critical path(s) are identified and marked on the network diagram.
10. Length of critical path or total project duration is found out.
11. Lastly, the probability that the project will finish at due date is calculated.

All activity arrows must begin and end with event nodes. It is shown in the following figure:



### 1.1 Introduction to Critical Path Method (CPM)

- The E. I. Du Pont de Nemours Company (USA) in the year 1958 while overhauling a chemical plant employed a technique called Critical Path Method to schedule and control the project and experienced a good amount of saving.
- Unlike PERT, CPM developed in civilian business and engineering industry where activity timings were relatively well known.
- CPM is applicable to both large and small projects, taking from space programmes to wedding or horse shows. It is widely recognized and is the most versatile and potent management planning technique.
- CPM is a technique, used for planning and controlling the most logical and economic sequence of operations for accomplishing a project. The project is analyzed into different activities whose relationship, as in

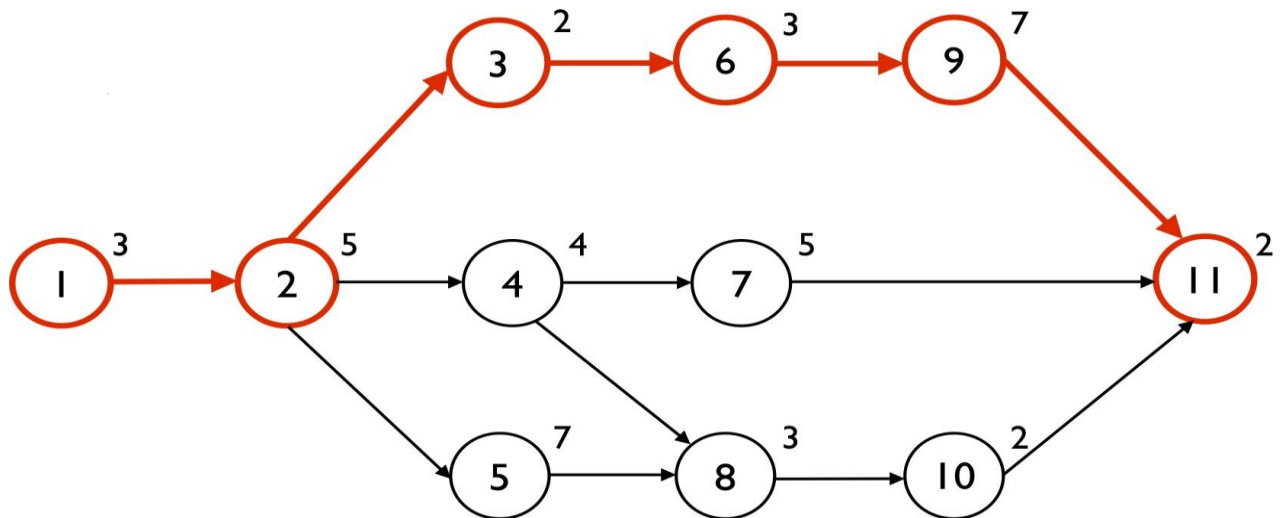


PERT, are shown on the network diagram. The network is then utilized for optimizing the use of resources, progress and control.

**The CPM employs the following steps for accomplishing a project planning:**

1. Break down the project into various activities systematically.
2. Label all activities.
3. Arrange all the activities in logical sequence.
4. Construct the arrow diagram.
5. Number all the nodes (events) and activities.
6. Find the time of each activity.
7. Mark the activity times on the arrow diagram.
8. Calculate early and late, start and finishing times.
9. Tabulate various times and marks Earliest Start Time (EST) and Latest Finished Time(LFT) on the arrow diagram.
10. Calculate total float for each activity.
11. Identify the critical activities and mark the critical path on the arrow diagram.
12. Calculate the total project duration.
13. If it is intended to reduce the total project duration, crash the critical activities of the network.
14. Optimize the cost
15. Update the Network.
16. Smooth the network resources.

### Diagram of Project Network (CPM)



### Difference between PERT & CPM

There is not much difference between PERT & CPM. In fact both were developed simultaneously and independently for the similar requirements. The only difference lies in the 'event' or 'activity' on which network is constructed. The 'activity' stands for the time-consuming parts of the project. It represents a job; on the other hand, an 'event', also called 'node' either beginning or an end of a job. The CPM analysis is activity-oriented and PERT is event-oriented.

1. The CPM is a kind of technique commonly known for its use in constructions project; whereas PERT mostly used in R & D projects like the projects considered being a kind of non-repetitive nature.
2. Both techniques have different concept of working like CPM uses deterministic concept for its work whereas probabilistic concept is used by PERT.
3. Networking approach also varies in both techniques like CPM uses networking that based upon activity oriented; on contrary PERT uses networking that based on event.

4. In PERT technique, an estimation of time for different activities is not perfect and accurate whereas in CPM activities duration are estimated with the quality of accuracy.
5. Both of the techniques used for same purpose but the nature of their working is different and some can do their work efficiently with CPM and some can do same with PERT.
6. The most important thing to solve is to minimize time so that they can get good result for their cost factor. In PERT, time is said to be a controlling factor.
7. CPM has one-time estimate while PERT has three time estimates.
8. Unpredicted activities are managed with the help of Program Evaluation and Review Technique (PERT), whereas CPM is used for dealing those projects that have some alarmed activities. These two techniques said to be a key element for the management of any project.

