

## UNIT-4

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### PROJECT MANAGEMENT

A Project simply means an investment opportunity exploited for profit. It is an idea or plan which is intended to be carried out or a finite task to be completed.

In the words of Gillinger “Project is a whole complex of activities involved in using resources to gain benefits”. The World Bank defines a project as ‘an approval for a capital investment develops facilities to provide goods and services’.

### CHARACTERISTICS OF A PROJECT

A project is undertaken to achieve a purpose. The following are the characteristics of a project.

- A project involves investment of money and money’s worth.
- The objective of a project is to earn profit.
- It is concerned with production of goods and services.
- Every project has risk and uncertainty associated with it.
- It has a fixed set of objectives.
- It is subjected to a lot of change.
- It has a definite beginning and an end.
- It has a life cycle reflected by growth, maturity and decay.

- It is combination of various elements such as technology, equipment, materials, machinery and people.
- A project requires team work.

## **CLASSIFICATION OF PROJECTS**

The different classifications are explained below:

### **1) QUANTIFIABLE AND NON-QUANTIFIABLE PROJECTS:**

Quantifiable projects are those in which quantitative assessment of benefits can be made. Projects for industrial development, power generation, mineral development etc. fall under this category. Non quantifiable projects are those in which the benefits cannot be measured quantitatively. Projects involving health, education and defence fall under this category.

### **2) SECTORAL PROJECTS:**

According to planning commission of India, a project may fall in the following sectors:

- a) Agriculture and allied sector.
- b) Irrigation and power sector.
- c) Miscellaneous sector.
- d) Transport and communication sector.
- e) Industry and mining sector.

This classification is useful for resources allocation at macro levels.

### **3) TECHNO-ECONOMIC PROJECTS:**

Projects may be classified into the following three groups:

**A) Factor Intensity Oriented Classification:** Project may be classified as Capital intensive or Labour intensive. If large investment is made in plant and machinery the project will be called Capital intensive. If large investment is made in human resources, the projects will be termed as Labour-intensive.

**B) Causation Oriented Classification:** It is classified as demand based or raw material based projects. If a project is started by an entrepreneur due to non-availability of certain goods or services and consequent demand for such goods or services the project is said to be based on demand. If project is started by an entrepreneur simply because of the availability of certain raw materials, skills or other inputs, the project is said to be based on raw material.

**C) Magnitude Oriented Classification:** The size of investment forms the basis of classification. May be classified as Large-scale, Medium-scale and Small-scale.

#### **4) FINANCIAL INSTITUTIONS CLASSIFICATION:**

The projects are classified according to their age and experience and the purpose for which the project is being taken up. They are as follows:

##### **A) Profit Oriented Projects:**

- 1) New projects.
- 2) Expansion projects.
- 3) Modernization projects.
- 4) Diversification projects.

##### **B) Service Oriented Projects:**

- 1) Welfare projects.
- 2) Service projects.
- 3) Research and development projects.

## 5) ACCORDING TO THE URGENCY OF THE EXECUTION: It

is classified into three. They are as follows:

A) **Normal Projects:** In this type of project adequate time is allowed for implementation. This type of project will require minimum capital cost.

B) **Crash Projects:** Additional capital costs are incurred to save time. It is normally achieved in procurement and construction where time is brought from vendors and contractors by paying extra money to them.

C) **Disaster Projects:** Vendors who can supply within a very short time are selected irrespective of the cost. Naturally capital cost will go up very high but projects time will get much reduced.

## NEED OF PROJECT MANAGEMENT

The need for project management arises due to the following reasons:

1) **Complexity of Project:** Project involve time, effort, money etc. If there is any fault in planning or implementation of projects, the resources put in the projects would be a waste.

2) **Achievement of Objectives:** Unless projects are managed well, the objective for which the projects are undertaken cannot be achieved.

3) **Environmental Changes:** A project should be well equipped to meet the environmental challenges .The success of the project depends upon how the project is able to cope with the changing environment.

4) **Competition:** To face out the competition provision of a good or a service is not sufficient. It must provide a package which meets an entire need rather than just part of that need .

5) **Constraints:** The constraints relate to time, materials, demand, labour etc.

The success of a project depends on how well it is possible to manage the so called constraints.

6) **Risk and Uncertainty:** At every stage of project life cycle there are challenges and problems. As the project moves new challenges and problems may arise. The risks and uncertainties cannot be eliminated but can be minimized through proper management of project.

7) **Time Overrun and Cost Overrun:** If a project takes more time than the scheduled time, it is known as time overrun. If a project incurs more costs than budgeted, it is called cost overrun.

8) **Project Control and Evaluation:** It is done either at the end of the project or few years after the completion of the project. This enables to learn lessons from the projects.

## **PROJECT LIFE CYCLE**

The project is initiated to achieve a mission and is said to be completed when the mission is achieved. The project lives between these two cut off periods and this intermediate time is called Project Life Cycle. Project life cycle consists of the following three stages:

- 1) **Pre-Investment Phase:** It is concerned with formulation of objectives, demand forecasting, evaluation of input characteristics, selection of strategy, projections of financial profile, cost benefit analysis and finally pre-investment appraisal. Some expenditure has to be incurred in the form of conducting surveys, feasibility studies etc.
- 2) **Construction Phase:** This stage consumes maximum expenditure. Construction phase consists of developing the infrastructure for the project.

The capital requirement includes cost on land, buildings, civil works, machinery equipment, ancillaries etc.

- 3) **Normalization Phase:** The primary objective of this stage is to produce the goods and services for which the project was established. The expenditure has to be incurred on raw materials, fuel, utilities, and administration and operation maintenance. Etc.

According to Cleland and King a project passes through the following phases:

- 1) Conception phase.
- 2) Definition phase.
- 3) Production.
- 4) Observation.
- 5) Divestment.
- 6) Post-Mortem.

The following figure model of the project life cycle that is suitable for any type of project.

## **PROJECT MANAGEMENT**

Project management is the process of planning, organizing, monitoring and controlling of all aspects of a project and motivating all involved to achieve project objectives of safety and completion within a defined time, cost and performance. Harson has defined project management as ,” the achievement of a project’s objectives through people, and involves organizing, planning and control of the resources assigned to the project together with the development of constructive human relations with all those involved, both in company and with the other companies involved”.[

## **PHASES OF PROJECT MANAGEMENT**

It consists of the following stages:

1. **Project Identification:** It refers to identification of business/investment opportunities. It involves scanning of the environment to find out investment opportunities.
2. **Project Formulation:** It is the translation of the idea into concrete project with scrutiny of its important preliminary aspects.
3. **Project Appraisal:** It involves searching, scrutiny, analysis and evaluation of market, technical, financial and economic variables. It examines the viability of the project.
4. **Project Selection:** It is the process of choosing a project rationally in the light of objectives and inherent constraints on the basis of appraisal.
5. **Project Implementation:** It is the stage of birth of an enterprise. At the end of this stage, the idea becomes a reality.
6. **Project Follow Up and Evaluation:** It is the process of assessing the performance of the project after it started functioning. Project evaluation simply means assessing the progress of the project.

## **OBJECTIVES OF PROJECT MANAGEMENT**

The ultimate objective of project management is to attain the objectives for which the project has been undertaken. The other objectives of project management are as follows:

- 1) To achieve maximum productivity at minimum cost.
- 2) To maximize income and return.

3) To minimize risk and uncertainty.

4) To eliminate waste and improve efficiency.

5) To make the most efficient and effective use of resources- manpower, money, materials, technology etc.

## **PROJECT REPORT**

A project report may be defined as a document with respect to any investment proposal based on certain information and factual data for the purpose of appraising the project. It states as to what business is intended to be undertaken by the entrepreneur and whether it would be physically possible, financially viable, commercially profitable and socially desirable to do such a business. Project report is an essential document for procuring assistance from financial institutions and for fulfilling other formalities for implementation of the project. The project report (Detailed Feasibility Report) is based on a preliminary report or pre-investment report. Thus the project report is a post investment decision report.

## **OBJECTIVES OF THE PROJECT REPORT**

The basic aim of a project report is to assess the financial viability of a project as well as the soundness of its production, marketing and other related aspects. It serves the following main objectives.

1) It facilitates business planning and planning the future course of action.

2) It enables an entrepreneur to compare different investment proposals and select the most suitable project.

3) It provides a SWOT analysis, wherein the strengths, weaknesses, opportunities and threats involved in the projects as shown.

4) The project report enables the entrepreneur to ensure that he is







proceeding in the right direction.

- 5) In case of public sector projects this report would also enable the concerned authorities to take an objective decision on the project.
- 6) It facilitates project appraisal.
- 7) It helps the financial institutions to make appraisal as regards financial, economic and technical feasibility.

## **IMPORTANCE OF PROJECT REPORT**

Project report is a written plan of the project to be undertaken for the attainment of objective. It enables an entrepreneur to know the inputs required and confirms that he is proceeding in the right direction. It spells out the reasons of allocating resources of the firm for the production of goods and services during a specific period. An important aspect of the project report lies in determining the profitability of the project with minimum risks in the execution of the project. The important uses of P.R. are summarized as follows:

-  It helps the entrepreneur in establishing techno-economic viability of the project.
-  It helps in getting term loan from banks and financial institutions.
-  It helps in approaching bank for getting working capital loan.
-  It helps in securing supply of scarce raw materials also.

📌 It gives a general idea of resource requirements and means of procuring them.

📌 It shows the feasibility of the project and possibility of achieving profits.

## **CONTENTS OF PROJECT REPORT**

It contains relevant information in detailed and systematic manner as below:

- 1) **INTRODUCTION:** General information regarding the company and production description.
- 2) **BACKGROUND OF THE PROMOTER:** - Name, address, age, family background, educational qualification, work experience, investment potential etc.
- 3) **PRODUCT:** - Details of products to be produced, details of application of the product, proposed product mix, product standard etc.
- 4) **MARKET AND MARKETING:-** Market potential analysis, major buyers, area to be covered, trade practices, sales promotion devices, trade practice and trade channels adopted by the competitors, demand analysis, proposed market research etc.
- 5) **LOCATION:-** Locational advantages, criteria for selecting the location, exact location of the project, other choices.
- 6) **PRODUCTION PROCESS:** - Details of technology, process flow chart, manufacturing process, production programme etc.
- 7) **RAW MATERIAL:** - List of raw material required in terms of quality and quantity, sources of requirement, cost of raw material etc.
- 8) **UTILITIES:** -Water, power, steam-sources and costs, effluent disposal etc.

**9) TRANSPORT AND COMMUNICATION:** - Method, possibility of getting and costs of transport.

**10) MANPOWER REQUIREMENT:** -Requirement of skilled, semi skilled personnel, technical and non-technical personnel, cost of procurement, capacity, and suppliers cost, alternatives available, cost of miscellaneous assets.

**11) LAND AND BUILDING:** - Land area, construction area, cost of construction, detailed plan, plant lay out along with cost.

**12) PLANT AND MACHINERY:** - Details of machinery and equipment required.

**13) COST OF PROJECT AND SOURCES OF FINANCE:**- Working capital required, preliminary and pre-operative expenses, contingencies and arrangements for the meeting the cost of project.

**14) FINANCIAL VIABILITY OF THE PROJECT:** -Cost of production and profitability for the first years, break even analysis, and analysis of cash flow and fund flow statements.

## **REQUISITES OF AN IDEAL PROJECT REPORT**

The essentials of an ideal project report are as follows:

- Project report should be prepared with the help of an expert team.
- Assumptions in the project report should avoid extremities.
- Project report is the means and not the end.
- Product demand, capital resources, raw material availability, labour resources etc must be estimated properly after considering varied factors.
- Project report should be based on proper survey and systematic preliminary study of the project.

- Thorough discussions must be made with experts, various personnel of concerned departments before finalizing the report.
- The end result should be to receive finance and to get the project implemented.
- Complete satisfaction of the entrepreneur/promoter should be ensured before the report is submitted to the financial institutions.

### **PROBLEMS FACED IN THE PREPARATION OF PROJECT REPORT**

An entrepreneur may face the following problems in the preparation of a project report:

- 1) Strict condition of promoter's contribution may dampen the enthusiasm of entrepreneurs.
- 2) All lending institutions demand a lot of documents before credit is granted.
- 3) Problems regarding working capital assessment due to unrealistic assumptions.
- 4) Time overrun will lead to cost overrun.
- 5) Lending institutions expect strict specifications with regard to size of the land, buildings, sources of machinery, their costs etc.
- 6) A number of clearances have to be obtained from the government departments. This causes strain and wastage among entrepreneurs.

## SPECIMEN OF A PROJECT REPORT:

Project Profile for Manufacturing Unit.....

A. PRODUCT DESCRIPTION

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B. PRODUCTION AND GENERAL EVALUATION OF PROSPECTS:

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C. MARKET ASPECTS

1. Users:
2. Sales Channels & Methods:
3. Geographical Extent of Market:
4. Competitive Situation:
  - (a) Domestic Market
  - (b) Export Market
5. Market needed for plant described:

D. PRODUCTION REQUIREMENTS Rs.

Salient Features

1. Annual Capacity (One/Two/Three-Shift Operation)
2. Capital Requirements  
Land & Buildings on rent (Mention value, if owned)  
Equipment, furniture and fittings  
Working capital
3. Total capital which the entrepreneur would need for the whole project provided he uses agencies planned by the Government for financial accommodation as discussed in the book
  - (i) Own
  - (ii) Borrowings
4. Expected net profit per annum

E. CAPITAL REQUIREMENTS Rs.

1. Fixed assets & working capital
  - (a) Land(....sq. metres) and Building(....sq. metres) on rent at Rs. ...per annum
  - (b) Equipments:
    - (i) Production Equipment (List down in an appendix, giving values, etc., of each machine separately)
    - (ii) Other Tools & Equipment
    - (iii) Furniture and Fittings

(c) Working Capital  
 [This would be calculated keeping in view the periods in which capital on an average in various forms, i.e. manufactured goods, semi-manufactured goods, raw material etc., would remain locked up. Often you may calculate it at 3 months' requirement level, unless the situation (line of industry) warrants otherwise]

			<u>Total</u>
II. Raw Material & Allied Supplies (Annual)			
Description	Qty.	Rate Rs.	Annual Requirements
1.			
2.			
3.			
4.			
5.	Power, Fuel & Water		
6.	Maintenance & Allied Supplies		
7.	Other Supplies		
			<u>Total</u>
III. Manpower (Annual)			
Description	No.	Rate (Rs.) per month	Annual Cost Rs.
Manager			
Foreman			
Supervisors			
Skilled Workers			
Semi-Skilled Workers			
Unskilled Workers			
Office Staff			
Others			
			<u>Total</u>
IV. Other Costs (Annual)			
(a)	Depreciation on equipment, furniture & fittings ....annum		
(b)	Interest on capital (fixed and working ....per annum on average)		
(c)	Administrative Costs		
(d)	Sales cost (Including Sales Commission, Advertisement, etc)		
(e)	Provision for discount, bad debts and miscellaneous contingencies		
(f)	Training costs		
E. TOTAL ANNUAL COSTS, SALES REVENUE AND NET PROFITS			
(a)	Annual Costs		
(i)	Rent for Land & Buildings		
(ii)	Raw Materials & Allied Supplies		
(iii)	Manpower		
(iv)	Other Costs		
(b)	Annual Sales Revenue		
(c)	Expected Annual Net Profit (b-a) say		
(d)	% Profit on Own Capital		
(e)	% Profit on Total Annual Sales Turnover		
(f)	% on Total Investment		
			<u>Total</u>

**PROJECT FORMULATION**

It is the process of examining technical, economic, financial and commercial aspects of a project. It is the process and steps through which an opportunity becomes a project in which the entrepreneur is willing to invest his time, money and other resources. This study is undertaken to find out whether the proposed

project would be feasible or not.



## **NEED FOR PROJECT FORMULATION**

The following are the major problems:

- 1) **Knowledge About Government Regulations:** The entrepreneur must have a thorough knowledge about Government regulations, policies, licensing procedures etc.,
- 2) **Absence of External Economies:** A project has to depend upon other industries for the supply of raw material, power, spares etc,
- 3) **Non-Availability of Technically Qualified Personnel.**
- 4) **Resource Mobilization.**
- 5) **Selection of Appropriate Technology:** Modern technologies developed in the advanced countries may not be suitable for adopting in the developing countries.

## **ELEMENTS OF PROJECT FORMULATION**

It involves a number of elements, they are summarized as below:

-  **Feasibility Analysis:** It involves an examination of the project idea in the light of internal and external constraints. Internal constraints arise because of limitations of the project sponsoring body and external constraints arise due to the characteristic of the environment. If on feasibility analysis, the project is found feasible, the same is put to further analysis.
-  **Techno-Economic Analysis:** It is mainly concerned with the identification of the project demand potential and selection of the optimal technology suitable for achieving the project objectives. This study includes:
  - a) **Estimation Of Demand Or Market Potential:** The entrepreneur has to

estimate the expected share of the sale in the market, intensity of competition, mobility of products to other places etc., The data collected from various sources are first compiled, tested and tabulated in a form suitable for interpretation.

b) **Selection Of Technology:** It refers to that combination of controlled variables which will ensure the achievement of the project objectives with minimum expenditure of resources.

📌 **Project Design and Network Analysis:** A project comprises certain sequential activities which are interrelated. These activities can be shown in the form of a diagram, which is called network diagram. Project design is concerned with the development of a detailed work plan of the project and its time estimates. When a network is designed, its analysis is carried out to identify the optimal course of action so as to complete the project with the minimum of time and cost, subject to the available resources. Important network analysis techniques are PERT (Programme Evaluation Review Technique) and CPM (Critical Path Method).

📌 **Input Analysis:** Input analysis is primarily concerned with the identification, qualification and evaluation of project inputs. The objective of input analysis is to identify nature of resources needed to estimate the quality of the required resources and to ensure that there is continuous and adequate supply of inputs. Input analysis is the basis for financial analysis and cost benefit analysis.

📌 **Financial Analysis:** It involves estimates about the project costs and revenues and the funds required for the project. It seeks to find out whether the project will generate income to realize the ultimate objective for which it is undertaken.



📌 **Social Cost Benefit Analysis:** Under cost benefit analysis the investment projects are evaluated from the point of view of the society as a whole. The cost benefit analysis aims at analyzing the real contribution of an investment project towards welfare of the country as a whole. It implies the enumeration and evaluation of all the relevant costs and benefits. It can be applied to both private and public investments.

📌 **Pre-Investment Appraisal:** The proposal gets the final and formal shape. The purpose of pre-investment appraisal is to enable the concerned authorities to take an investment decision about the project i.e. to accept or reject.

## **TECHNICAL ANALYSIS**

Technical analysis of a project is essential to ensure that necessary physical facilities required for production will be available and the best possible alternative is selected to procure them. The object of technical analysis is to assess the technical soundness of the project. This is considered essential for the long term success of the project.

Technical analysis includes the study of the following:

1) **MATERIAL INPUTS:** It is essential to assess the availability of materials, inputs and utilities. Utilities include power, water, steam, fuel, communication facilities, transport facilities etc. The feasibility study of material should include the following variables:

- (a) The availability of quality and quantity of raw material.
- (b) Price elasticity of raw material.
- (c) Perishable time of raw material.

(d) The factors on which the availability of raw material is depended.

2) **MANUFACTURING PROCESS/TECHNOLOGY:** Technologies simply refers to the tools, devices and knowledge that help in the transformation of inputs into outputs. It is the application of knowledge, encompassing the related concepts of science, innovation, invention and discovery. It is the application of scientific knowledge to practical commercial purpose.

### **Factors Influencing the Choice of Technology**

The choice of technology is influenced by the following considerations:

- 1) Plant capacity.
- 2) Inputs.
- 3) Investment outlay.
- 4) product mix.
- 5) Latest developments.
- 6) Cost.

### **Sources of Technology**

The technical know-how can be procured from the following sources:

- 1) Foreign Collaboration.
- 2) Consultancy Organizations.
- 3) Machinery Suppliers.
- 4) Promoter's knowledge and experience.
- 5) Recruitment of suitable technical personnel.

6) CSIR Laboratories and National Research and Development Corporation (NRDC).

An entrepreneur may use either indigenous technology or imported technology. When he is not satisfied with indigenous technology, he can make use of imported technology. This process of availing global technology is called technology transfer.

3) **PLANT CAPACITY:** It refers to the volume or number of units that can be manufactured during a given period. Plant capacity is also called production capacity.

### **Considerations for Plant Capacity**

The following factors should be taken into consideration:

- 1) Technological requirement.
- 2) Input constraints.
- 3) Investment cost.
- 4) Market consideration.
- 5) Resources of the firm.
- 6) Government policy.

4) **PLANT LOCATION:** It refers to a fairly broad area where the enterprise is to be established like city, industrial zone or coastal area. The success of a project depends on the location, to a certain extent. They are discussed as follows.

- 1) Proximity to raw material.

- 2) Nearness to market.
- 3) Availability of infrastructure facilities.
- 4) Transport and communication facilities.
- 5) Effluent disposal.
- 6) Labour.
- 7) Government policies.
- 8) Climatic condition.
- 9) Environmental considerations.
- 10) Other factors.

**5) SIZE OF THE PLANT:** The efficiency and profitability of a project are very much influenced by its size. Size of the plant depends on the manufacturing process, availability of raw materials, capital investment needed and the size of the market. Size of the plant depends on:

- 1) Availability of raw materials and power.
- 2) Technology/process to be adopted.
- 3) Size of the market.
- 4) Size of the plant and machinery.
- 5) The location of the project.
- 6) The product mix.
- 7) Capital investment required.

**6) PRODUCT MIX:** Product mix or range is decided according to market requirement. It refers to the set of all the products offered by a firm for sale. The range of products to be marketed depends on the following:

- a) Nature of business.
- b) Nature of product.
- c) Competition.
- d) Tastes of consumers.
- e) Size of target market.
- f) Plant capacity.

**7) FACTORY DESIGN:** It refers to the plan for a particular type of building, arrangement of machinery and equipment and provision of service facilities, lighting, heating etc. in the building. Factory design comprises layout of building and layout of factory.

### **Importance of Factory Design**

Important benefits of a good factory design are summarized as follows:

- 1) Storage and movement of material.
- 2) Service facilities.
- 3) Supervision.
- 4) Employee morale.
- 5) Productivity.

## Factors Affecting Factory Design

While designing a factory the following factors should be considered:

- 1) Location.
- 2) Nature of the manufacturing process.
- 3) Plant layout.
- 4) Smoothness in operation.
- 5) Service facilities.
- 6) Material handling.
- 7) Cost of construction of building.
- 8) Future expansion.
- 9) Nature of product.
- 10) Appearance.

**8) MACHINERIES AND EQUIPMENTS:** The requirement of machinery and equipment is dependent on production technology and plant capacity. It is also influenced by the type of project. To determine the kind of machinery and equipments required for manufacturing industry the following procedure may be followed.

- 1) Estimate the likely levels of production over time.
- 2) Define the various machinery and other operations.
- 3) Calculate the machinery hours required for each type of operation.
- 4) Select machineries and equipments required for each function.

The equipments required for the project may be classified into the following types:

- 1) Plant equipments.
- 2) Mechanical equipments.
- 3) Electrical equipments.
- 4) Instruments.
- 5) Controls.
- 6) Internal transportation system.
- 7) Others.

**9) PLANT LAYOUT:** Proper plant layout can reduce manufacturing cost by saving money and time. It refers to the arrangement of the machines, equipments and other physical facilities within the factory premises .It is a floor plan for determining and arranging the desired machinery and equipment in the best place to permit the quickest flow of material at the lowest cost with least amount of material handling in processing the product from the receipt of raw materials to shipment of the finished product. There are five types of plant layout, they are as follows:

- 1) **Product Layout:** It is also called line layout. In this type machines and equipments are arranged in the sequence or order in which they are used in the manufacture of a given product .It is best suited in mass production, because it allows continuous flow of material in process towards the finished product stage.
- 2) **Process Layout:** It is also called as functional layout. In this type similar machines are placed in one place according to the operations or functions they perform.

3) **Combined Layout:** Here some of the machines may be arranged in product layout and some others in process layout. It combines the advantages of both the layout forms.

4) **Stationary Layout:** The men and equipment are moved to the materials which remain in one place. The product is completed at that place where material lies. It is also called fixed position layout .It is necessary in ship building, aircraft manufacturing, job welding shops etc.

5) **Cellular Layout:** This is an innovative layout, and based on group technology principles. In this type machines dedicated to sequences of production are grouped into cells.

#### **FACTORS INFLUENCING PLANT LAYOUT**

While deciding the layout the following factors should be considered:

- ✓ Nature of industry.
- ✓ Volume of production.
- ✓ Type of production.
- ✓ Location.
- ✓ Material handling
- ✓ Type of equipment
- ✓ Factory building.
- ✓ Service facilities.
- ✓ Lighting and ventilation



- ✓ Future expenses
- ✓ Environment aspects

## **NETWORK ANALYSIS**

The network techniques have their origin in the late fifties in USA. These techniques were developed to facilitate planning, scheduling and monitoring the projects in an integrated manner so that these could be completed within the constraints of desired time, cost and performance.

### **MEANING OF NETWORK ANALYSIS**

Network is a combination of activities and events of a project. Network analysis is a system which plans projects by analyzing the project activities. Network analysis is one of the most popular techniques used for planning, scheduling, monitoring and co-coordinating large and complex projects comprising a number of activities. It is concerned with evaluation of time and resources profile of project activities.

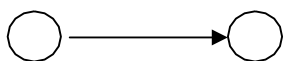
### **OBJECTIVES OF NETWORK ANALYSIS**

1. It is a powerful tool for planning, scheduling and controlling of projects.
2. It helps to minimize total cost.
3. It shows in simple way the interrelationship of various activities constituting a project.
4. It helps delegation of the power and authority.
5. It facilitates management by exception.
6. It avoids production delays.

7. It leads to optimal use of resources.
8. It helps to minimize time for a given cost.
9. It helps the entrepreneur to complete the project in time.

## TERMS RELATED TO NETWORK ANALYSIS

- 📌 **Network:** Network refers to series of related activities which results in some product or service.
- 📌 **Network Diagram:** It is the backbone of network technique. It shows the activities and events of a project in a logical sequence. It is also known as project graph or arrow diagram.
- 📌 **Activity:** It means the element of job or task or item of work to be completed in a specific time. Activity consumes time, money, effort and resources. Each activity is represented by a arrow(  $\longrightarrow$  )
- 📌 **Event:** It represents the start or end of an activity. An event is generally represented by a circle (  $\bigcirc$  ) called node. Each activity has 2 events- tail event and head event. Tail event is the beginning of an activity. Head event is the end of an activity.



Tail Event Head Event

## STEPS IN NETWORK ANALYSIS

1. Preparation of network.
2. Estimation of time to perform each activity.
3. Computation of critical path schedule.

4. Interpretation of results.

## **NETWORK TECHNIQUES**

A number of network techniques have been developed. Few of them are given below:

- ❖ CPM: Critical Path Method.
- ❖ PERT: Programme Evaluation Review Technique.
- ❖ GERT: Graphic Evaluation and Review Technique.
- ❖ RAMS: Resource Allocation and Multi Project Scheduling.
- ❖ RPSM: Resource Planning and Scheduling Method.
- ❖ MAP: Manpower Allocation Procedure.
- ❖ LOB: Line of Balance.

Among these CPM and PERT are the most widely used network analysis techniques in project management.

## **CRITICAL PATH METHOD (CPM)**

It was developed in 1956, by Morgan R Walker of Dupont Company and James E Kelly of Remington Rand. After preparing the network diagram and indicating the time for each activity, we can identify the various possible paths.








## **APPLICATION OF CPM**

CPM can be used in the following areas:

- 1) Construction of building or highway.
- 2) Construction of dams or canals.

- 3) Communication networks.
- 4) Production planning.
- 5) Maintenance and overhaul of aero planes or oil refinery.

## TERMS RELATED TO CPM

-  **Path:** It refers to unbroken or continuous chain of activities from the start event to end event in the network diagram.
-  **Critical Path:** It is the path which takes longest duration. It is represented by double or thick arrow line to distinguish it from the other non critical paths.
-  **Critical Activities:** These are activities lying in the critical path and its delay in start will cause a further delay in the completion of the entire project. Activities with zero floats are called critical activities. Such activities require special attention.
-  **Preceding Activities:** Activities that must be completed immediately prior to the start of another activity are called predecessor activities.
-  **Succeeding Activities:** Activities that cannot be started until one or more of other activities are completed but immediately succeed are called successor activities.
-  **Concurrent Activities:** Activities which can be accomplished concurrently or simultaneously are known as concurrent activities.
-  **Earliest Start Time (EST):** it is the earliest time an activity can start on the assumption that all its preceding activities started at the earliest possible times. It is calculated by moving from first to last event in a network diagram.

📌 **Latest Start Time (LST):** It is the latest possible time an activity can finish without delaying the project on the assumption that all subsequent activities are finished as planned. It is the difference between the latest finish time and the estimated time for the activity to be completed.

📌 **Earliest Finish Time (EFT):** It is the sum of the earliest start time and the estimated time to perform the activity. (i.e.,  $EST + \text{activity duration}$ )

📌 **Latest Finish Time (LFT):** It is calculated by moving backward i.e., from last event to first event of the network diagram.

📌 **Forward Pass:** The objective is to determine the earliest expected start and finish of the constituent activities of a project.

📌 **Backward Pass:** It is the process of determining the latest allowable starting and finishing time of an activity. The computation starts at the end event of a project and moves backwards.

📌 **Float (Total Float):** It means the amount of excess or spare time up to which an activity can be delayed without affecting the overall completion time of the project. It is the difference between the latest finish time and earliest start time.

$$\text{Total Float} = \text{LFT} - \text{EFT} \text{ or } \text{LST} - \text{EST}$$

📌 **Free Float:** It is the excess of the available time over the required time when the activity, as well as its successor activity start as early as possible.

$$\text{Free Float} = \text{EST of the successor} - \text{EFT of the present Activity}$$

📌 **Independent Float:** It is the amount of time an activity could be delayed if preceding activities finish at their latest and subsequent activities start at their earliest.

Independent Float = EST of successor – LFT of predecessor – Duration.

If a negative value of independent float is obtained, then independent float is taken as zero.

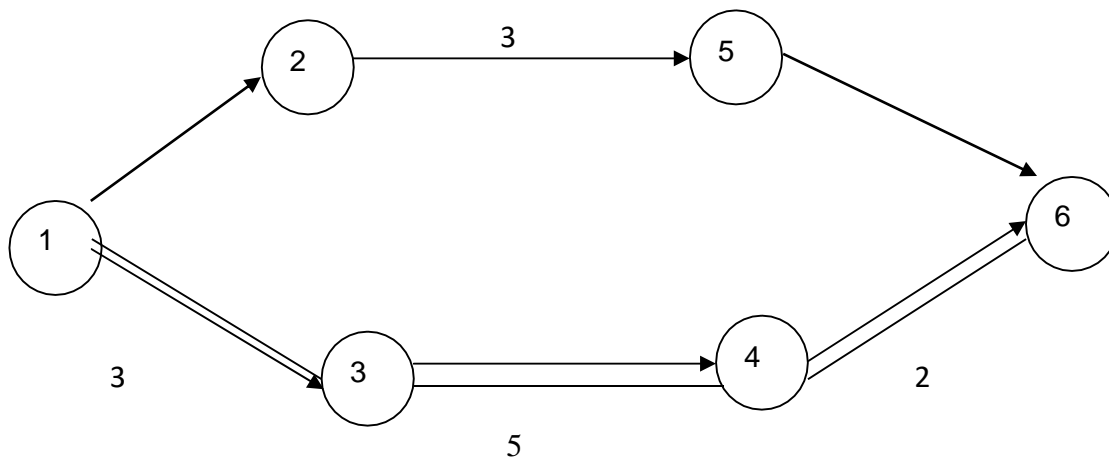
### **STEPS IN CPM**

- 1) Arrange all activities in a logical sequence.
- 2) Construct arrow diagram and number all the events.
- 3) Mark activity times on arrows.
- 4) Calculate earliest and latest starting/finishing times and mark these times on arrow diagram.
- 5) Identify critical path.

For example,

Activity	Duration (months)
1-2	2
1-3	3
2-4	3
3-4	5
2-5	3
4-6	2
5-6	4

Solution:



Network Diagram

In the above diagram, 3 possible paths can be identified as follows:

- (a) 1-2-5-6 requiring  $2+3+4 = 9$  months in completion of the project.
- (b) 1-2-4-6 requiring  $2+3+2 = 7$  months in completion of the project.
- (c) 1-3-4-6 requiring  $3+5+2 = 10$  months in completion of the project.

The third path (1-3-4-6) takes longest time in completion of the project and hence

it is the critical path. The activities in the critical path are critical activities and these activities can be delayed to the extent of float available without affecting the overall project duration.

### **ADVANTAGES OF CPM**

- 1) It makes better and detailed planning possible.
- 2) It helps in ascertaining the time schedule.
- 3) Control by management becomes easy.
- 4) It identifies most critical elements and thus more attention can be paid on these activities.
- 5) It facilitates optimum utilization of resources.

### **LIMITATIONS OF CPM**

- 1) It is based on the assumption of precise known time for each of these activities.
- 2) It ignores statistical analysis in determining the time estimates.
- 3) It facilitates solution for the problem.

### **PROGRAMME EVALUATION REVIEW TECHNIQUE (PERT)**

It was developed by a Navy sponsored Research Team composed of D.G. Malcolm, J.R. Rose boom, C.E. Clark and W. Fazar in 1958. PERT is a network technique of scheduling and controlling the project where activity times cannot be precisely estimated. Its primary purpose is to facilitate the planning and controlling of a project in order to achieve lower costs, reduce project time and more effective



co-ordination and utilization of human and physical resources. PERT deals with the problems of uncertain activity times. Generally 3 time estimates are used.

They are:

- 1) **Optimistic Time (to):** It is the shortest possible time in which an activity can be completed. The probability of happening this is 1 in 100.
- 2) **Pessimistic Time (tp):** It is the maximum possible time in which an activity can be completed-e, if everything goes wrong. The happening this also might be 1 in 100.
- 3) **Most Likely Time (tm):** This lies in between 'to' and 'tp'. It is the estimated time in the normal conditions that an activity would require.

The expected time of each activity would be calculated by the following formula:  $t_e = \frac{t_o + 4t_m + t_p}{6}$

#### **STEPS IN PERT**

- 1) Activities are arranged in a logical sequence.
- 2) Network diagram is drawn and events are numbered.
- 3) Using 3 times estimates, the expected time for each activity is calculated.
- 4) Slack is calculated and critical path is identified.

5) The total project duration is worked out.

6) Standard deviation and variance for each activity are found.

$$\text{Variance} = \left( \frac{t_p - t_0}{6} \right)^2$$

$$\text{Standard deviation} = \sqrt{\left( \frac{t_p - t_0}{6} \right)^2}$$

**SLACK:** - It is similar to float. Float is associated with activity and used in CPM. Slack is associated with event and is used under PERT. It is the difference between the latest allowable time and earliest completion time. Slack is the maximum time an activity can be delayed without delaying the completion of project. Slack is zero on critical activities.

### APPLICATION OF PERT

Following are the major areas where PERT can be used:

- ❖ In managing accounts and budgeting of the organization.
- ❖ In administration such as planning manpower profile or paper work of the organization.
- ❖ In maintenance and major repairs of ships, rockets, steel furnaces, scheduling aircrafts etc.
- ❖ In installing and recognizing new systems such as plant, machinery, computers etc.
- ❖ Research and development projects.
- ❖ Defense projects.

## **ADVANTAGES OF PERT**

- ❖ Reduces cost and time.
- ❖ Easily shown in chart form.
- ❖ Permits effective control.
- ❖ It provides updated information about the project.
- ❖ Provides improved estimates of the expected time to complete an activity by using multiple time estimates.
- ❖ It facilitates the right action, at right point and right time in the organization.

## **LIMITATIONS OF PERT**

- ❖ Developing a clear and logical network is difficult.
- ❖ In some projects not all activities can be so clearly identified.
- ❖ It is not useful in certain kinds of projects like projects which are subject to change.
- ❖ It emphasizes only on time and not cost.
- ❖ There may be errors in time estimation.

## **FINANCIAL ANALYSIS**

It is defined as the process of obtaining relevant information about a project in order to ascertain its financial viability. The preliminary steps involved in the financial analysis include:

- 1) Estimation of total capital outlay involves in the project.
- 2) Estimation of operating costs.
- 3) Estimation of operating revenue.

Its purpose is to find out whether the project is attractive enough to secure funds needed for its various activities and whether the project will be able to generate enough income to achieve the objective for which it is undertaken.

### **ESTIMATION OF CAPITAL OUTLAY**

Capital outlay of a project refers to the sum of the expenditure till the date of starting commercial production. It includes all advance expenditure. Cost of fixed assets, duties and taxes. Consultancy charges interest charges, intangible expenses, registration fees and provision for contingencies.

The capital cost outlay is required not only for assessing fund requirement but also for ascertaining the economic viability of the project. Capital cost outlay is shown in the statement of capital cost estimation.

### **ESTIMATION OF OPERATING COSTS**

Operating costs are those which have to be incurred after the project commences production. Operating costs vary with quantity of output. Operating costs cover material cost, labour cost, overhead costs and incidental expenses. A

proforma of operating costs shows the operating cost estimates.

### **ESTIMATION OF OPERATIONAL REVENUE**

Operating cost is incurred to generate operating revenue or sales. It is necessary to assess the demand potential and the anticipated sale price of the goods. Sales and production are closely related and they can be estimated together through an estimate of production and sales. It shows details of installed capacity, value of sales etc.

### **ESTIMATION OF WORKING RESULTS**

For assessing the profitability of a project, the estimates of operating costs and revenues are matched, using a proforma profit and loss statement. It will show details on expected sales, net sales, cost of production, gross margin, general and administrative expenses, taxes, dividend etc.

### **ESTIMATION OF FINANCIAL POSITION**

In order to ascertain the financial position of a firm, at a given point of time, a proforma balance sheet is prepared with the help of projected assets and liabilities. It helps in preparation of projected funds flow and cash flow statements and to compute various ratios on profitability, liquidity and solvency of the project.

### **TECHNIQUE OF FINANCIAL ANALYSIS**

Having prepared the projected financial statements, the process of financial analysis is carried out through funds flow analysis, break-even analysis, cash flow analysis and ratio analysis.

## **FUND FLOW ANALYSIS**

Fund flow statement is prepared to show in assets, liabilities and net worth between two balance sheet dates. It is prepared to ascertain how much funds have been generated and how these funds were put to use. This will assist minimizing cost of finance and avoiding idle fund situation. The term 'fund' here means working capital. Flow of funds means the change in working capital.

## **CASH FLOW ANALYSIS**

Cash is a critical asset. It acts as a fuel on which a project runs and it has to be kept ready all the time. Cash flow statement is prepared to ensure that the business unit will have necessary cash with it and it will not face liquidity problems. It shows the movements of cash into and out of the firm and its net effect on the cash balance with the firm. A cash flow statement is very useful to:

- 1) Determine the amount of cash needed to start the enterprise.
- 2) Plan for timing of loan funds.
- 3) Ensure that if projected cash flows are met, cash will be available to meet payments as they become due.

## **RATIO ANALYSIS**

It is used to have an in depth examination of the strength and potential pitfalls of the organization. Ratio analysis helps to compare current performance

with the past and also in measuring effectiveness and efficiency of the organization in the light of norms of performances. They help the management in the discharge of its key functions such as forecasting, planning, co-ordinating, controlling and communicating. Ratio analysis technique now a days one of the most comprehensive and widely used methods in almost all the organizations.

## **ANALYSIS OF OPERATIONAL STRATEGY**

The operational strategy can be evaluated by employing the following techniques:

### **BREAK-EVEN ANALYSIS**

The break-even analysis is the most widely used technique of cost volume profit analysis used in its narrow sense. It is the point at which losses cease and profits begin. Break-even point is an equilibrium point or value between costs, prices and profits. Indeed it is a balancing point a point of no profit no loss. It is also called zero point costs. In a broad sense, it refers to a system of analysis that can be used to determine the probable profit at any level of activity. It is a tool of financial analysis whereby the impact on profit position of the changes in volume, price, costs and mix can be estimated definitely and accurately.

#### **COMPUTATION OF BEP**

BEP is found out by using the formula or using a graph. It is computed by using the following formula.

$$\text{BEP (Units)} = \frac{\text{Fixed Cost}}{\text{Contribution per Unit}}$$

$$\text{BEP (Rupees)} = \frac{\text{Fixed Cost}}{\text{total Contribution}} \times \text{Sales}$$

## **ADVANTAGES OF BREAK EVEN ANALYSIS**

Break even analysis presents the picture of profit at different levels of production. From the management point of view the following are the important uses;

- 1) It helps to take investment decision.
- 2) It serves as a useful tool for cost control.
- 3) It assists in the formulation of price policies.
- 4) It can be used to study the comparative plant efficiencies of the industry.
- 5) It is useful for determining costs and revenue at different levels of activity.
- 6) It helps to determine the selling price which gives desired profits.
- 7) It is useful in forecasting sales and profits.

## **LIMITATIONS OF BREAK-EVEN ANALYSIS**

- 1) It assumes that the future projections can be made on the basis of past record but this is not correct.
- 2) It has limited application in the long range planning.
- 3) Break-even analysis completely ignores the capital employed in project.
- 4) It assumes that fixed costs remain fixed for any level of production. But actually it will remain fixed only up to a certain level of activity.
- 5) Break-even analysis is a short run analysis of cost volume relationship. It will change according to variation in costs of material, labour and the introduction of new methods or product or new equipment.
- 6) The profits are a function of not only output but also other factors such as



technological changes, improvements in the art of management etc. These have been ignored in break- even analysis.

- 7) It assumes that variable costs vary in direct proportion to volume of production. But the variable cost need not necessarily vary in direct proportion of output.

### **SENSITIVITY ANALYSIS**

The technique of sensitivity analysis helps in studying the impact of crucial variables like raw material, sales volume, sales price, degree of capacity utilization etc. over the economic viability of an enterprise. Under this approach the value of different key variables is changed in a systematic manner. In other words, change is effected in one variable and the other variables are assumed constant and the results are analyzed to find out sensitivity of various variables with respect to their impact on profit margin.

### **RISK ANALYSIS**

The risk analysis helps in identifying the sources of risks such as rise in prices of raw material, taxes and duties, product price etc. which have great bearing in determining the future returns for the project. Accordingly risk analysis offers an opportunity to the investor to redesign his proposed project.

### **PROJECT FINANCING**

Finance is one of the foundations of economic activity of mankind. It is needed for starting the business and also to keep it going. It is rightly described as the life blood of any industrial or commercial undertaking.

## **CLASSIFICATION OF CAPITAL**






On the basis of the purpose for which finance is required, finance or capital may be classified into fixed or block capital and working or circulating capital.

### **FIXED CAPITAL**

It refers to the amount required for acquiring fixed assets like land, building, machinery etc.

### **FACTORS GOVERNING FIXED CAPITAL REQUIREMENTS**

The amount of fixed capital requirement of a project depends on the

-  following factors: Nature of project.
-  Size of the project.
-  Diversity of production
-  line. Method of production.
-  Method of acquiring fixed assets.

### **WORKING CAPITAL**

It consists of funds invested in current assets. There are two concepts of working capital. One is gross concept and the other is net concept. Gross concept working capital refers to the amount of funds invested in current assets. Working capital is equal to total current assets. Net concept working capital refers to the excess of current assets over current liabilities. Working capital is equal to current assets minus current liabilities.

## **TYPES OF WORKING CAPITAL**

It is broadly classified into two- permanent working capital and variable working capital.

1) **Permanent Or Fixed Working Capital** :- It is the minimum amount of working capital required to ensure effective utilization of fixed assets and support the normal operation of the business. It is again divided into two.

(A) **Initial Working Capital**- It is the capital with which the project is commenced.

(B) **Regular Working Capital**: - It is the minimum amount of the liquid capital to keep up the circulating capital from cash to inventories, to receivables and back again to cash.

2) **Variable Working Capital**: - This is the additional capital needed to meet seasonal and special needs. It is again divided into two.

(A) **Seasonal Working Capital**: - It refers to the additional working capital required during busy seasons.

(B) **Special Working Capital**: - It may be required to carry on a special sales campaign or financing slow moving stock or financing a period of strike or lockout etc.

## **FACTORS DETERMINING WORKING CAPITAL**

It depends upon the following factors:

- ✓ Character of business.
- ✓ Size and volume of business.

- ✓ Length of processing period.
- ✓ Turnover.
- ✓ Terms of purchase and sales.
- ✓ Seasonal variation.
- ✓ Importance of labour.
- ✓ Cash flow.
- ✓ Stock.
- ✓ Cyclical fluctuation.

## **SOURCES OR MEANS OF FINANCE**

There are basically two sources available for financing project- internal sources and external sources. If the size of the project is large, the fund requirement will have to be financed from external sources. The technique of raising capital from multiple sources is known as layered financing. The following shows the various sources of project finance

### **A) SOURCES OF LONG TERM FUND (FINANCE FIXED CAPITAL REQUIREMENT):-**

- 1) Issue of shares.
- 2) Issue of debentures.
- 3) Term loans from specialized financial institutions like IFCI, IBRD etc.
- 4) Venture capital.

### **B) SOURCES OF MEDIUM TERM FUNDS (FINANCE FIXED WORKING CAPITAL REQUIREMENT):-**

- 1) Public deposits.
- 2 ) Deferred credits.
- 3) Lease finance.
- 4) Subsidy and other incentives/assistance from the government.
- 5) Hire purchase.

**C) SOURCES OF SHORT TERM FUNDS (FINANCE WORKING CAPITAL REQUIREMENT):-**

- 1) Trade credit.
- 2) Commercial banks.
- 3) Accounts receivable.

The important means of finance are discussed as follows:

**1) SHARE CAPITAL:** - Shares may be issued by a company after its incorporation or by an existing company. There are two types of share capital.

**A) Equity Share Capital:** - It represents the contribution made by the equity shareholders. The advantage of raising equity capital is that the company need not mortgage any of its assets to secure it from the market.

**B) Preference Share Capital:** - They enjoy a preferential right in respect of dividend and also repayment of capital in case of winding up in priority to equity shareholders. Financing through preference shares is much cheaper than the equity shares. -

2) **DEBENTURE CAPITAL:** - It refers to borrowings. Debenture holders being creditors have neither voting powers nor control in policy making. They get a fixed rate of interest even if the company incurs losses.

3) **TERM LOANS:** - It is granted on the basis of a formal agreement between the borrower and the lending institution. Long term capital provided directly by a lender in the form of a negotiated contract according to all details of the agreement is called term loan.

4) **VENTURE CAPITAL:** - It refers to giving capital to enterprise that has risk and adventure. It is a financial investment in a highly risky project with the objective of earning a high rate of return.

5) **PUBLIC DEPOSITS:** - A company can raise deposits to meet its capital needs directly from the public at an interest rate generally above the bank rate.

6) **DEFERRED CREDITS:** - Under this arrangement payments to suppliers of plant and equipments are made in agreed instalments over a specified period of time at some agreed rate of interest on the outstanding balance.

7) **INCENTIVE SOURCES:** - The government and its agencies may provide financial support as incentives to certain types of promoters or for setting up industrial units in certain locations.

8) **LEASE FINANCING:** - it can be explained as a contract between the owner of the asset and the user of the asset whereby the owner of the asset gives it to the user

for a consideration. The owner of the asset is called the lessor and the user of the asset is called the lessee. The consideration which is required to be paid by the lessee for using the asset is called lease rental.

**9) INSTITUTIONAL FINANCE:** - There are several financial institutions for giving financial assistance to entrepreneurs. Some of them are IDBI, IFCI, SIDBI, NABARD etc.

### **FEASIBILITY STUDY REPORT**

It analyses availability of raw material, skills and expertise, capital, market etc. It should be noted that any project must be technically feasible, financially sound, economically viable and socially acceptable. The feasibility report contains only important information obtained from technical analysis, financial analysis, economic analysis; social cost benefit analysis etc. It forms the basis for investment appraisal and decision making.

### **PROJECT APPRAISAL AND EVALUATION**

The project has to be appraised in relation to the feasibility of the technical, economic, financial, commercial, managerial, social and other aspects of the project. It is defined as critical and careful second look at the project by a person not associated with the project preparation. The objective of a project appraisal is to decide whether to accept or reject an investment proposal.

### **ELEMENTS OF PROJECT APPRAISAL**

There are mainly seven aspects of project appraisal. They are:

1) **Technical Feasibility:** - It includes detailed estimates of the goods and

services needed for the project- land, machineries and equipments, raw material, trained labour etc. Location of the project should be given special attention in relevance to technical feasibility. Another important feature of technical feasibility relates the type of technology to be adopted for the project.

2) **Economic Viability:** - It is a study on capital cost, working capital, operating cost and revenue, marketing, profitability etc. It also includes an appraisal of anticipated demand and capacity utilization.

3) **Commercial Viability:** - The appraisal of commercial aspects of a project involves a study of the proposed arrangements for the purchase of raw materials and sale of finished products etc. The main objective is to see that the proposed arrangements will ensure that the best value is obtained for money spent.

4) **Financial Feasibility:-** It seeks to ascertain whether the project is financially viable regarding the cost of project, cost of production and profitability, cash flow estimate and Performa balance sheet. It will study whether the project will satisfy the return expectations of those who provide the capital.

5) **Managerial Competence:** - Proper evaluation of managerial ability and talent is an essential part of appraisal of a project. While evaluating the management, back ground of the entrepreneur and promoters, their character and integrity, past record of promotion etc are studied.

6) **Social Consideration:** - The social objective of a project are also considered keeping in view of the interests of the public. The projects which offers large employment potential, which are located in backward areas or projects which will stimulate small industries or growth of ancillary industries are given special consideration.

7) **Ecological Analysis:** - It is necessary to ensure whether the project causes




pollution, whether it disturbs the equilibrium of ecology and whether it fits into the environment.

8) **Project Risk Analysis:-** Project face a host of risk such as project completion risk, resource risk, price risk, technology risk, political risk, interest rate risk etc. An analysis of such risks is helpful in the appraisal of a project.

## **METHODS OF PROFITABILITY APPRAISAL**

The most important and popular of these can be classified into two broad categories as follows:

 **NON-DISCOUNTING TECHNIQUES OR TRADITIONAL METHODS:** - It does not take into consideration the time value of money. Important traditional methods may be discussed as follows:

A) **URGENCY METHOD:** - Urgency or degree of necessity plays an important role and project that cannot be postponed is undertaken first.

### **Merits**

- ✓ It is a very simple technique.
- ✓ It is useful in case of short term projects requiring lesser investment.

### **Demerits**

- ✓ Selection is not made on the basis of economical consideration but just on the basis of situation.
- ✓ It is not based on scientific analysis.

B) **PAY BACK METHOD:** It is cash based technique. It is a period over which the investment would be paid back. It is a breakeven point of the project, where the accumulated returns equal investment. It is also called 'pay-out' or 'pay-off' period

or 'recoupment' or 'replacement period'.

1. **When Annual Cash Inflows Are Equal:-** when cash inflows/ benefits are even or equal pay back period is calculated as follows:-

$$\text{Payback period} = \frac{\text{Original cost of project (cash outlay)}}{\text{Annual net cash inflow (net earnings)}} \quad \text{or} \quad \frac{I}{C}$$

For example: If cash outlay is Rs. 500000 and Annual net cash inflow is Rs.100000 for 7 years

$$\text{Pay Back Period} = \frac{500000}{100000} = 5 \text{ years}$$

The whole cost of the original investment is recovered with five years.

2. **When Annual Cash Inflows Are Unequal:** when cash inflows/ benefits are not equal pay back period is calculated in the form of cumulative cash inflows as follows:-

For example: If the cost of the project is Rs.100000 and the cash inflows are: 1<sup>st</sup> year Rs.10000; 2<sup>nd</sup> year Rs.15000; 3<sup>rd</sup> year Rs.25000; 4<sup>th</sup> year Rs.30000 and 5<sup>th</sup> year Rs.30000. payback period to recover original investment of Rs.100000 comes to 4 yrs and 8 months.(Rs.80000 is recovered in 4yrs and to recover the balance Rs.20000, 8 months are required.

20000

$$\frac{20000}{30000} = 2/3 \text{ yrs or 8 months.}$$

Payback period can also be calculated as follows

$$\text{Pay Back Period} = E + \frac{B}{C}$$

E = No. of years immediately preceding the year of final recovery

B = Balance amount still to be recovered

C = Cash inflow during the year of final recovery

### **DECISION RULE (or SELECTION CRITERION):-**

According to pay back criterion, the shorter the payback period, the better the project.

### **ADVANTAGES OF PAY BACK METHOD**

- It is simple to understand and easy to apply.
- It is very important for cash forecasting, budgeting and cash flow analysis.
- It minimizes the possibility of losses through obsolescence.
- It takes into account liquidity.
- It is easier for projects yielding returns in initial years.

### **DISADVANTAGES OF PAY BACK METHOD**

- It ignores the time value of money.

- It completely ignores cash inflows after the payback period.
- This method does not measure profitability of projects..It insist only on recovery of the cost of the project.
- It does not measure the rate of return.
- It may become misleading because it is based on a single factor.

### **C) POST PAY BACK METHOD: -**

The post pay back method has been evolved to overcome the limitations of pay back method. Under this method, the entire cash inflows generated from a project during its working life are taken into account. It is calculated as under:

Post Pay Back Profitability = Total Cash Inflows in Life - Initial Cost

Or

Annual Cash Inflows × (Total Life – Pay Back Period)

The second alternate formula is useful only when annual cash inflows are equal

### **D) AVERAGE RATE OF RETURN METHOD (ARR):-**

It represents the ratio of the average annual profits to the average investment in the project. It is based on accounting profits and not cash flows. This is also known as *Accounting Rate of Return Method* or *Return on Investment Method* or *Unadjusted Rate of Return Method*. ARR is found out by dividing average income by the average investment. It is calculated with the help of the

$$\text{Average Investment} = \frac{\text{Average Income/return}}{\text{Average Investment}} * 100$$

$$\text{Average Income/Return} = \frac{\text{Original Investment} + \text{Scrap Value}}{2}$$

$$\text{Average Investment} = \frac{\text{Cost at the Beginning} + \text{Cost at the end of the life}}{2}$$

## **ROLES AND RESPONSIBILITIES OF PROJECT MANAGER**

The following are the roles and responsibilities of a project manager:

1. Managing personnel.
- 2) Satisfy government, customer, promoters and public.
- 3) Coordinating and integrating activities across multiple functional lines.
- 4) Defining and maintaining the integrity of the project.
- 5) Setting targets and development of systems and procedures for accomplishment of project objectives.
- 6) Developing project execution plan.
- 7) Coping with risk associated with project management.

8) Managing human interrelationships.

9) Maintaining the balance between technical and managerial project functions.

## **INSTITUTIONAL FINANCE TO ENTREPRENEURS**

Commercial banks

Other financial institutions

IDBI

IFCI

ICICI

IRBI

LIC

UTI

### **Commercial Banks**

Scheduled Commercial Banks(SCBs) comprises:

The State Bank of India(SBI) and its associated banks(8)

Nationalized banks(19)

Private sector banks(32)

Regional rural banks(196)

Foreign banks(23)

- The first bank which initiated financial assistance to small scale industries was SBI
- Nationalization in 1969 paved way for commercial banks in initiating finance to SSI.
- Commercial banks provided assistance for :
  - ▣ Working capital requirements
  - ▣ Term finance
  - ▣ Lead Bank Scheme : RBI initiative which focuses on allotting one SCB to one district for intensive development of banking facilities.
- Credit Guarantee Scheme – Started in 1960, Aims at increasing the credit flow to the SSIs and solving problems of sickness in SSI.

Introduced to 22 districts initially and expanded all over the country.

### **IDBI(Industrial Development Bank of India)**

- Established on July 1, 1964 under Act of Parliament as a subsidiary of RBI.
- In Feb 1976, IDBI was made as an autonomous institution and ownership was passed to Govt of India.
- IDBI provides assistance to SSI by **refinance and bills rediscounting scheme.**
- **SIDF**(Small Industries Development Fund) – May 1986 to facilitate development & extension of SSI.

- ❑ **NEFS**(National Equity Fund Scheme) – 1988 to provide equity to tiny and small industries not exceeding Rs.5 lakhs.
- ❑ In order to make coordinating role more effective, Narasimham Committee has suggested that IDBI should give up direct financing role and perform only promotional and refinancing role.

### **IFCI(Industrial Finance Corporation of India Ltd)**

- ❑ Govt of India set up IFCI under IFCI Act in July 1948.
- ❑ In July 1993, it was brought under Companies Act 1956.
- ❑ IFCI extends financial assistance through :
  - ❑ Currency loans
  - ❑ Underwriting/Subscriptions to shares / debentures
  - ❑ Guarantees
  - ❑ Equipment procurement
  - ❑ Equipment finance
  - ❑ Equipment leasing
  - ❑ Buyers and suppliers credit
- ❑ Financial resources of IFCI has three components :
  - ❑ Share capital
  - ❑ Bonds and debentures



- ▣ Other borrowings

- IFCI schemes :

- ▣ Interest subsidy schemes to women entrepreneurs

- ▣ Consultancy fee subsidy schemes for providing marketing assistance to SSI

- ▣ Encourage modernization of tiny, small scale industries

- ▣ Control pollution of small & medium scale industries

- Flaws of IFCI :

- ▣ Discriminatory policy towards small and medium scale industries

- ▣ Delay in sanction of loans

Failure to exercise control over borrowers

### **ICICI (Industrial Credit Investment Corporation of India Ltd)**

- Setup in Jan 1955 under Companies Act with the objective of developing small and medium scale industries in private sector.

- Functions :

- ▣ Assistance – rupee loans, underwriting and subscriptions to shares / debentures, guarantees

- ▣ Financial services - Deferred credit, leasing credit, installment sale, asset credit and venture credit

- ▣ Loans from private investment sources
- Subsidiaries of ICICI:
  - ▣ Merchant banking division – Industrial credit
  - ▣ Asset Management Company – Mutual Fund
  - ▣ ICICI Investors Services Ltd(1994)
  - ▣ ICICI Banking Corporation Ltd(1994)
  - ▣ Though ICICI assists all sectors like private, joint, co-operative and public, the major beneficiary is private sector comprising small scale units.

### **IRBI (Industrial Reconstruction Bank of India)**

- Setup in April 1971 under Companies Act to look after the special problem of sick units and provide assistance in speedy reconstruction and rehabilitation.
- Initially set up as Industrial Reconstruction Corporation of India (IRCI) and converted into IRBI in 1984.
- IRCI extended assistance to sick units of textiles, engineering, mining and Foundary industries.
- IRBI diversified activities into consultancy services, merchant banking and equipment leasing.

Also helped in amalgamation, merger and reconstruction

## **LIC (Life Insurance Corporation of India)**

- Setup in 1956 as a wholly owned corporation of Govt of India to nationalize insurance business.
- Offers a variety of insurance policies to extend social security to various segments of society.
- Provides loans for housing, water supply, rural electrification to benefit individuals and groups.
- Also provides loans and underwriting / direct subscriptions to shares and debentures of corporate sector.
- Assistance sanctioned :
  - New projects – 37.3%
  - Expansion / diversification – 31.2%
  - Modernization / rehabilitation / balancing equipment – 12.4%

## **UTI (Unit Trust of India)**

- Established under Act of Parliament in 1964
- Mobilizes savings of small investors and channelizes them into corporate investments.
- Provides loans and underwriting / direct subscriptions to shares and debentures of corporate sector.

During 1994-95, UTI launched 9 new schemes like Unit plan, Retirement Benefit Plan, Primary Equity Fund, Unit Scheme.

**Assistance sanctioned :**

New projects – 50%

Expansion / diversification – 12.6%

Modernization / rehabilitation / balancing equipment – 1.7%

Loans for working capital – 34.9%

***The Content in the E-Material has been taken from the text and reference book as given in the Syllabus***