UNIT -3

Small Enterprises and Enterprise Launching Formalities

DEFINATION OF SMALL SCALE:

Sometimes called a small business, a small scale enterprise is a business that employs a small no. of workers and does not have a high volume of sales such enterprise are generally privately owned and operated sole proprietorships, corporations or partnership. Defining small scale industry is a difficult task because the definition of small scale industry varies from country to country and from onre time to the another in the same country depending upon the pattern and sytage of development,government policy and admmnitrative setup of a particular country.

The Small-Scale Industries (SSI) have a crucial role in a developing economy like India. They play a strategic role in the progress of the country. These industries by and large represent a stage in economic transition from traditional segments to modern segments. The traditional nature of this process is reflected in the diversities of these industries. Some small scale units employ simple skills and mechanism while many other units use modern and sophisticated technology. Now, our economy is facing a challenge of economic growth. It has to accelerate the productivity of many important areas like agriculture and industry by improving their techniques of production. SSIs have been assigned to fulfil these expectations in more economic and diversified way. SSIs constitute an important part of the Indian economic structure. They integrate a continuing element in the scheme of national planning. They are a strategic part of the Indian economy as well as a progressive and effective decentralized sector, which is closely related with agriculture and medium and large-scale industries. The whole scheme of a socialistic pattern of society with employment for all rests on the decentralisation and wide distribution of economic activity, enterpreneurship and economic advantages. The basic social philosophy underlying Indian Planning is to develop medium and large scale sector only to take advantage of modern technology. Over the rest of the field, SSIs will be encouraged to play their active role. If there is change in scale, 2 that has to be developed with the help of mutual co-operation, both horizontal and vertical. Thus, small and large-scale industries are two legs of industrialisation process of a country. Hence, small-scale industries are found in existence in every country. Small-scale industries have been given an important place in the framework of Indian planning since beginning both for economic and ideological reasons. Today, India operates the largest and oldest programmes for the development of small-scale industries in any developing country. As a matter of fact, small sector has now emerged as a dynamic and vibrant sector for the Indian economy in the recent years. Before we discuss various aspects of small industry development, it seems pertinent to begin with an introductory framework of small industries in India.

MEANING AND DEFINITIONS OF SMALL SCALE INDUSTRY

Small-scale industry comprises of a variety of undertakings. The definition of small-scale industry varies from one country to another and from one time to another in the same country depending upon the pattern and stage of development, Government Policy and administrative set up of the particular country. As a result, there are nearly 50 different definitions of SSIs found and used in 75 countries. All these definitions either relate to capital or employment or both or any other criteria. We trace here the evolution of the legal concept of small-scale industry in India. There can be two bases for defining small business and these are:

I. Scale of Business:

The size or scale of business can be measured in various ways like :

(i) Investment on plant and machinery
(ii) Employment generation.
(iii) Investment and Employment.
(iv) Volume and/or value of production.
(v) Volume and/or value of sales.

II. Qualitative Aspects: These can be:-

(i) Ownership of small business is in the hands of an individual or a few individuals.
(ii) Management and control of small-scale firm is with the owner or owners.
(iii) Technology adopted in small-scale unit is normally labour intensive.
(iv) Small-scale business is normally carried on in a limited or local area.

Various definitions of small-scale unit are as under:

According to Fiscal Commission, 1950 "A unit operating mainly with hired labour usually 10 to 50 hands."

According to Small Scale Industries Board, 1955 "A unit employing less than 50 persons if using power and less than 100 persons without the use of power and with a capital investment not exceeding Rs. 5 lakhs."

According to Ministry of Commerce and Industry, 1960 "An industrial unit with a capital investment of not more than Rs. 5 lakhs irrespective of the number of persons employed."

According to Ministry of Commerce and Industry, 1966 "An undertaking having an investment in plant and machinery of not more than Rs. 20 lakhs and 25 lakhs in case of ancillary units."

According to Government of India, 1985 "An undertaking having an investment in plant and machinery of not more than Rs. 35 lakhs and not more than Rs. 45 lakhs in case of ancillary units."

According to Government of India, 1991 "An undertaking having an investment in plant and machinery of not more than Rs. 60 lakhs and not more than 75 lakhs in case of ancillary units." According to Government of India, 1997 "An undertaking having an investment in plant and machinery of not more than Rs. 3 crores." According to Government of India, 2000 "An undertaking having an investment in plant and machinery of not more than Rs. 1 crores." It is evident from the above definitions that there was upward revisions in the investment limit on plant and machinery in small scale sector from Rs. 5 lakhs to Rs. 3 crores over years but this limit has been reduced to Rs. 1 crore in the year 1999-2000.

RATIONALE OF SMALL SCALE INDUSTRIES:

Following are the main rationales to support small-scale industries in India:

1. **The Factor Price Argument:** It is commonly argued that for various institutional reasons, labour used in large enterprise is priced well above the levels at which it is used in small-scale 11 industries. The SSI sector, which uses more labour and less capital per unit of output, will have relatively lower costs as their training and development costs are quite low. Besides, large enterprises are ready to pay more as they have to attract more stable migrants from rural areas. Cost of developing commitments among them to firm specific is also quite high. But small units make greater use of the unstable labour with high turnover because in their case the stability – efficiency relationship for the work force is much weaker. Their labour cost is much less expensive as they generally use less expensive often second hand machines which need less training to use and whose cost of damage from misuse is less. The high labour productivity in large firms enables the firm specific labour to claim a share of profit. The motivation of an exclusive labour force can only be sustained if management is sympathetic to profit sharing ideas. Unionisation of labour force in large enterprises is another important variable. But these types of problems are not available in small-scale enterprises.

2. Employment Argument: In view of India's scarce capital resources and abundant labour, the most important argument advanced in favour of the SSIs is that they have a potential to create immediate large-scale employment opportunities. The increasing emphasis on SSIs in developing countries like India stems largely from the widespread concern over unemployment hovering in the country. There are many research findings available, which well establish that small-scale units are more labour intensive, than large units. In other words, small units use more of labour per unit of output than investment. According to

a study, while the output-employment ratio is the lowest in the small-scale sector, employment-generating 12 capacity of small sector is eight times that of the large-scale sector. P.C. Maha Lvoyis also supports the view that small industries are fairely labour intensive. He mentions that with any given investment, employment possibilities would be ten or fifteen or even twenty times greater in comparison with corresponding factory system.

3. Equality Argument: One of the main arguments put forward in favour of the small-scale industries is that they ensure a more equitable distribution of national income and wealth. This is accomplished because of the two major considerations: (i) compared to the ownership of large-scale units, the ownership pattern in SSI is more widespread (ii) their more labour–intensive nature, on the one hand, and their decentralisation and dispersal to rural and backward areas, on the other, provide more employment opportunities to the unemployed. This results in more equitable distribution of produce of the small-scale units. It is also held that as most of the small enterprises are either proprietary or partnership concerns, the relations between the workers and the employees are more harmonious in small enterprises than in the large enterprises.

4. Decentralisation Agrument: Decentralisation argument impresses the necessity of regional dispersal of industries to promote balanced regional development in the country. Big industries are concentrated everywhere in urban areas. But, small industries can be located in rural and semi-urban areas to use local resources and to cater to the local demands. Admittedly, it will not be possible to start small enterprises in every village, but it is quite possible to start small enterprises in a group of villages. 13 Decentralisation of industrial enterprises will help tap local resources such as raw materials, idle savings, local talents and ultimately improves the standard of living even in erstwhile backward areas. The most glaring example of this phenomenon is the economy of Punjab, which has more small-scale units than even the industrially developed state of Maharashtra. 5. Latent Resources Argument: This argument suggests that small enterprises are capable of mapping up latent and unutilized resources like hoarded wealth, ideas entrepreneurial ability, etc. However, Dhar and Lydall say that the real force of latent resources argument lies in the existence of entrepreneurial skill. They argue that there is no evidence of an overall shortage of small entrepreneurs in India. Hence, they doubt the force of this latent resources argument. Their assertion does not appear to be very sound simply because of the fact that if small entrepreneurs were present in abundance, than what obstructed the growth of small enterprise.

OBJECTIVES OF SMALL SCALE INDUSTRIES

The small scale sector can stimulate economic activity and is entrusted with the responsibility of realising the following objectives:- 7

1. To create more employment opportunities with less investment.
2. To remove economic backwardness of rural and less developed regions of the economy.
3. To reduce regional imbalances.
4. To mobilise and ensure optimum utilisation of unexploited resources of the country.
5. To improve standard of living of people.
6. To ensure equitable distribution of income and wealth.
7. To solve unemployment problem.
8. To attain self-reliance.
9. To adopt latest technology aimed at producing better quality products at lower costs.

ROLE OF SMALL SCALE INDUSTRIES IN INDIA:

Small-scale and cottage industries have been playing an important role in Indian economy in terms of employment generation and growth. It is estimated that this sector has been contributing about 47 per cent of the gross value of output produced in the manufacturing sector and the generation of employment by the small-sector is more than five times to that of large-scale sector. The following are some of the important roles played by small-scale industries in India:

1. Number of Units: Total number of registered small-scale and cottage units has been increasing rapidly from 16,000 in 1950 to 36,000 in 1961 and 8.53 lakh units in 1985-86 to 14.96 lakh 17 units in 1991-92. Moreover, there were about 5.84 lakh unregistered small-scale units in India. In 2000-01 the total number of small-scale and cottage units further increased to 33.7 lakh. But as per the census of SSI units, about 30 to 40% of these registered units might be non-functional. The Second All India Census of registered small-scale industrial units was conducted by Small Industries Development Organisation in 1987-88. Findings of the census also give added empirical support to the generally accepted hypothesis about the distinct characteristics of the SSI sector compared with those of the large and medium sector, namely lower capital base, lower capital/labour ratio, lower productivity of labour and higher productivity of capital and lower wage rates. These small-scale industries are also producing various types of commodities starting from simple consumer goods to the manufacture of sophisticated electronic goods.

2. Employment Generation: Small-scale industries are labour-intensive and thus are generating a large number of employment opportunities. Total employment generated by these small-scale industries has increased from 39-7 lakhs in 1973-74 to 96 lakhs in 1985-86. Employment of the small-scale sector has again increased

from 129.8 lakh in 1991-92 to 219.7 lakh in 2004- 05, showing an increase of about 4% over the previous year.

3. Investment: Investment in the small-scale sector has been increasing at a faster rate. As per the statistics made available by SIDO, total amount of investment in the small-scale units of India has increased significantly from Rs. 2233 crores in 1972-73 to Rs. 4431 crores in 1978-79 and then to Rs. 14,730 crores in 2004-05. Fixed investment per employee which was Rs. 6.4 thousand in 18 1972 as per SSI census gradually rose to Rs. 92.07 thousand in 2004-05 as per the results of Annual Survey of Industries (ASI).

4. Output: Total production of the small-scale units has increased from Rs. 7200 crores in 1973-74 to Rs. 57,100 crore in 1985-86. The value of output of the SSI sector in 2004-05 is at Rs. 7,89,620 crores showing an increase of 10.2% over the output of Rs. 5,72,887 crores in 1999.

5. Contribution to Exports: The contribution of SSI sector towards export has been increasing at a faster rate. The value of exports of the products produced by the small-scale sector has increased from Rs.393 crore in 1973-74 to Rs. 9,100 crore in 1990- 91 and then to Rs. 68,280 crore in 2004-05. Again in dollar terms, the value of exports from SSI sector has also increased from Dollar 8.87 billion in 1993-94 to Dollar 15.18 billion in 2004-05. The share of export from small-scale sector in the total export has increased from 9.6% in 1971-72 to 42% in 2004-05.

6. Equitable Distribution of Income: Small-scale and cottage industries has been resulting more equitable distribution of national income and wealth. This is mainly due to the fact that the ownership of small-scale industries is quite widespread as compared to large-scale industries and small-scale sector is having a higher employment potential than that of large-scale sector.

7. Mobilisation of Capital and Entrepreneurial Skill: Small-scale industries can mobilise a good amount of savings and entrepreneurial skill from rural and semi-urban areas which remained untouched from the clutches of large-scale sector. Thus, a huge amount of latent resources are being mobilised in the SSI sector for the industrial development of the country. 19 8. Regional Dispersal of Industries: Small-scale industries are playing an important role in dispersing the industrial units of the country in the various parts of the country. As the large-scale industries are mostly located in some states like Maharashtra, West Bengal, Gujarat, Tamil Nadu, thus dispersal of SSI units throughout the country can achieve the balanced pattern of industries development in the country. 9. Better Industrial Relation: The small-scale industries are maintaining a better industrial relations between employers and employees and thus can lessen the frequency of industrial disputes. But the large-scale industries are facing the problems of strikes and lockouts and hence good industrial relations in these industries are very difficult to maintain. Thus, the loss of production and mandays are comparatively less in small-scale sector. It is due to the

above mentioned factors the growth rate of small-scale industrial sector has remained faster in terms of its number, employment and output.

SSI registration:

SSI registration is a registration provided by the Ministry of MSME. A business should obtain SSI registration in order to be eligible for a number of schemes, subsidies and other incentives provided by the Government to such SSI's. SSI registration can be obtained online too. Let's look at the process of SSI registration online:

Overview of SSI registration

SSI registration is provided by the Ministry of Micro, Small and Medium Enterprises through the Directorate of Industries of the State Government. The main logic behind the SSI registration is to set up new SSI businesses in India. SSI registration helps the business to be eligible for a number of subsidies given by the Government. We can also get SSI registration online.

Eligibility Criteria for SSI registration

SSI registration can be obtained for:

- Manufacturing enterprise; and
- Service enterprise

For manufacturing enterprise, if the investment in plant and machinery (excluding land & buildings) is within any of the following levels:

Micro Enterprises: Investment of up to Rs.25 lakhs in plant and machinery
Small Enterprises: Investment of up to Rs.5 crores in plant and machinery
Medium Enterprises: Investment of up to Rs.10 crores in plant and machinery

For service enterprise, if the investment in plant and machinery (excluding land & buildings) is within any of the following levels:

Micro Enterprises: Investment of up to Rs.10 lakhs in equipment
Small Enterprises: Investment of up to Rs.2 crores in equipment
Medium Enterprises: Investment of up to Rs.5 crores in equipment
If the investment is done within the above-mentioned limits then the SSI registration has to be obtained.

Benefits of obtaining SSI registration

- There are various tax rebates offered to SSI's
- A credit for Minimum Alternate Tax (MAT) is allowed to be carried forward for up to 15 years instead of 10 years

- There are many government tenders which are only open to the SSI.
- They get easy access to credit.
- Once registered the cost of acquiring a patent, or the cost of setting up the industry reduces as many rebates and concessions are available.
- Business registered as SSI are given higher preference for government license and certification.

Business registered as SSI are given higher preference for government license and certification.

- To do the registration the SSI owner has to fill a single SSI online registration form. It can be done in the offline mode as well.
- If a person wants to get registration for more than one industry then also he/she can opt for an individual SSI registration done.
- To get registered he/she has to fill a single form which is available at the website.
- The documents required for the SSI registration are Aadhar number, industry name, address, bank account details and some common information.
- Here, the person can provide self-certified certificates.
- No registration fees is required for the registration.
- Once the SSI registration form is filled and uploaded, very soon you will obtain the SSI registration number.

No-Objection Certificate from Pollution Control Board

Central Pollution Control Board (CPCB) that comes under The Ministry of Environment, Forest and Climate in India works for checking the air, water, and noise pollution by ensuring the quality is maintained. It also issues guidelines for the purpose. Additionally, every state has its own Pollution Control Boards.

Any and every industry, operation or process which may result in the discharge of sewerage into the environment and if is likely to emit any substance into the environment that may cause any form of pollution mandatorily has to obtain a consent from the State Pollution Consent Board. This consent is as per the ***Water (Pollution & Control of Pollution) Act, 1974*** and ***Air (Pollution & Control of Pollution) Act, 1981***.

In a similar manner, the industries or processes which generates, stores, dispose of, transports, or handles any hazardous waste as per the ***Hazardous waste (Handing***

and Management) Rulesmust obtain authorization from the State Pollution Control Board.

According to Biomedical Waste (M & H) Rules, any medical institutions generating biomedical waste should also obtain appropriate Authorization.

Such consents are collectively known as **No-Objection Certificate (NOC)**

What are the types of consents or NOC?

Mainly three types of consent are applied:

- Consent to Establish
- Consent to Operate
- Renewal of Consent to operate

What are the Permissions/ Clearances required?

Every industry/ operation/ process should obtain several Environment and Pollution Related clearances and permissions according to the nature of the unit and the products manufactured.

1. A No Objection Certificate (NOC) must be obtained from the State Pollution Control Board before the commencement of any activity. For some industries which fall in the categories of highly polluting industries, an Environmental Impact Assessment (EIA) study is carried out and submitted to the State Pollution Control Board for approval.

2. For the Industries that require a system of Water and Affecting Effluent Disposal, a No Objection Certificate (NOC) from the State Pollution Control Board should be obtained.

3. For the industrial units that function outside the designated Industrial Area, appropriate permissions have to be taken from the Municipal Corporation, Municipality or the Panchayat. When required, a permission to convert agricultural land into the industrial area has to be taken from the appropriate authority.

4. An appropriate registration and licensing of the Boiler by the Chief Inspector of Boiler is required as a safety clearance before commencing the operations.

4. Special clearances of the Development Commissioner of the Export Processing Zone (EPZ) is required for registering as a 100% Export Oriented Unit (EOU) which enjoy several additional concessions.

What are the categories of Industries?

The Ministry of Environment, Forest and Climate Change, by a notification in 1989 introduced the concept of stricter guidelines for certain industries to protect ecology.

The concept of such categorization of industries as **"Red", "Orange", "Green" and "White"** is now accepted and extends to the whole country has is a part of the Water and Air Acts.

The categorization extends to not only the location of industries but also for the Consent Management, granting NOC and formulation of guidelines. The concept of categorization of industries continues to evolve.

What is the procedure to obtain the Consent to establish and Consent to Operate?

- The procedure is completely online and there is no need to visit the offices of the authority.
- AN application form has to be filled up and uploaded on the official site.
- The required documents can be uploaded on the official site along with the prescribed fee.
- To bring some ease to the process and for the speedy disposal of applications, the powers have been delegated to the various members and committees.
- The authorized officer assigns the application to a Field officer who reviews the application. Along with visiting the industry. A Visit Report is prepared and submitted to the Sub Regional Officer.
- Upon further scrutiny of the documents and other aspects, the application may be approved or rejected.

What are the documents required for obtaining NOC from the Pollution Control Board?

The lists of documents that are required to be annexed and uploaded with the application form vary as per each state and nature of the activity, process, and operation.

Some basic documents required are listed as follows-

- A location plan or site plan of the industry.
- A Proprietorship Certificate, Partnership Deed, Memorandum or Article of Association as applicable to the industry, operation or process.
- Valid documents of the land like Jamabandi, Registration deed or Lease Deed indicating specific details of the property.
- Brief Project Report with a flow chart indicating the Manufacturing Process.
- Compliance report of any previous Consent to Operate granted to the entity.
- Undertaking that the proposed site is located in the designated Industrial area as notified and the plan of the establishment is permissible. It should also indicate the detailed revenue entries.
- Other documents as per the State in which it situates, the location, activity etc
- Any industry specific documents or certificates.
- For a renewal application, a Request Letter must be submitted giving the reason for non-completion of the project in the time as stipulated earlier along with the current status.

Machinery and Equipment Selection Problem

Equipment may be defined as a physical entity which is used to carry out a general or specific activity inthe plant.The equipment selected should possess certain desirable characteristics or meet certain criteria to bebest suited to the desired task.Some of these criteria are:

(a) Fit into the system;
(b) Be as simple as possible;
(c) Require minimum space;
(d) Be flexible and adaptable;
(e) Require minimum of loading, unloading and rehandling;
(f) Call for as little maintenance, repair, power and fuel as possible;
(g) Have a long useful life;
(h) Capable of higher capacity utilization;
(i) Perform the operation efficiently and economically.

Selection of machineries and equipments is dependent upon:
-plant capacity and production technology

- type of project

In manufacturing ,various machines can perform same function with varying degree of accuracy. For selecting machinery and eqipments for manufacturing industry we should:

- Estimate the likely levels of production .
- Define varous machining and other operations.
- Calculate the machine hours required for each operation

PROJECT REPORT PREPARTION

Project Report is a **written document** relating to any investment. It contains data on the basis of which the project has been appraised and found feasible. It consists of information on economic, technical, financial, managerial and production aspects. It enables the entrepreneur to know the inputs and helps him to obtain loans from banks or financial Institutions.

The project report contains detailed information about Land and buildings required, Manufacturing Capacity per annum, Manufacturing Process, Machinery & equipment along with their prices and specifications, Requirements of raw materials, Requirements of Power & Water, Manpower needs, Marketing Cost of the project, production, financial analyses and economic viability of the project.

Following are the contents of a project report.

1. General Information

A project report must provide information about the details of the industry to which the project belongs to. It must give information about the past experience, present status, problems and future prospects of the industry. It must give information about the product to be manufactured and the reasons for selecting the product if the proposed business is a manufacturing unit. It must spell out the demand for the product in the local, national and the global market. It should clearly identify the alternatives of business and should clarify the reasons for starting the business.

2. Executive Summary

A project report must state the objectives of the business and the methods through which the business can attain success. The overall picture of the business with regard to capital, operations, methods of functioning and execution of the business must be stated in the project report. It must mention the assumptions and the risks generally involved in the business.

3. Organization Summary

The project report should indicate the organization structure and pattern proposed for the unit. It must state whether the ownership is based on sole proprietorship, partnership or joint stock company. It must provide information about the bio data of the promoters including financial soundness. The name, address, age qualification and experience of the proprietors or promoters of the proposed business must be stated in the project report.

4. Project Description

A brief description of the project must be stated and must give details about the following:

- Location of the site,
- Raw material requirements,
- Target of production,
- Area required for the workshed,
- Power requirements,
- Fuel requirements,
- Water requirements,
- Employment requirements of skilled and unskilled labour,
- Technology selected for the project,
- Production process,
- Projected production volumes, unit prices,
- Pollution treatment plants required.

If the business is service oriented, then it must state the type of services rendered to customers. It should state the method of providing service to customers in detail.

5. Marketing Plan

The project report must clearly state the total expected demand for the product. It must state the price at which the product can be sold in the market. It must also mention the strategies to be employed to capture the market. If any, after sale service is provided that must also be stated in the project. It must describe the mode of distribution of the product from the production unit to the market. Project report must state the following:

- Type of customers,
- Target markets,
- Nature of market,
- Market segmentation,
- Future prospects of the market,
- Sales objectives,

- Marketing Cost of the project,
- Market share of proposed venture,
- Demand for the product in the local, national and the global market,
- It must indicate potential users of products and distribution channels to be used for distributing the product.

6. Capital Structure and operating cost

The project report must describe the total capital requirements of the project. It must state the source of finance, it must also indicate the extent of owners funds and borrowed funds. Working capital requirements must be stated and the source of supply should also be indicated in the project. Estimate of total project cost, must be broken down into land, construction of buildings and civil works, plant and machinery, miscellaneous fixed assets, preliminary and preoperative expenses and working capital.

Proposed financial structure of venture must indicate the expected sources and terms of equity and debt financing. This section must also spell out the operating cost

7. Management Plan

The project report should state the following.

a. Business experience of the promoters of the business,
b. Details about the management team,
c. Duties and responsibilities of team members,
d. Current personnel needs of the organization,
e. Methods of managing the business,
f. Plans for hiring and training personnel,
g. Programmes and policies of the management.

8. Financial Aspects

In order to judge the profitability of the business a projected profit and loss account and balance sheet must be presented in the project report. It must show the estimated sales revenue, cost of production, gross profit and net profit likely to be earned by the proposed unit. In addition to the above, a projected balance sheet, cash flow statement and funds flow statement must be prepared every year and at least for a period of 3 to 5 years.

The income statement and cash flow projections should include a three-year summary, detail by month for the first year, and detail by quarter for the second and third years. Break even point and rate of return on investment must be stated in the project report. The accounting system and the inventory control system will be used is generally addressed in this section of the project report. The project report must state whether the business is financially and economically viable.

9. Technical Aspects

Project report provides information about the technology and technical aspects of a project. It covers information on Technology selected for the project, Production process, capacity of machinery, pollution control plants etc.

10. Project Implementation

Every proposed business unit must draw a time table for the project. It must indicate the time within the activities involved in establishing the enterprise can be completed. Implementation schemes show the timetable envisaged for project preparation and completion.

PROJECT PLANNING AND SCHEDULING USING NETWORKING TECHNIQUES OF PERT/CPM

PERT(**Programme Evaluation & Review Technique**)

Definition:

PERT was first developed as a Management Aid for completing Polaris Ballistic Missile Project in USA in October 1958. It worked well in expediting the completion of the project from 7 years to 5 years. Since then, PERT has become very popular technique used for project planning and control. In nutshell, it schedules the sequence of activities to be completed in order to accomplish the project within a short period of time. It helps reduce both the time and cost of the project. .

Steps involved in PERT:

The following steps are involved in PERT technique:

1. The activities involved in the project are drawn up in a sequential relationship to show what activity follows what.
2. The time required for completing each activity of the project is estimated and noted on network.
3. The critical activities of the project are determined.

Job Identification	Job Description	Activity	Time Required
A	Forecasting of Sales	1-2	10 Days

B	Sales Pricing	2-4	8 Days
C	Production Scheduling	2-3	9 Days
D	Cost Determination	3-4	7 Days
E	Preparation of Budget	4-5	12 Days
	Total		**36 Days**

4. The variability of the project duration and probability of the project completion in a given time period are calculated.

The above steps can be illustrated with the help of the following example. The Managing Director of XYZ Ltd. is interested in getting his Operating Budget prepared.

The project is decomposed into the following activities:

This is presented on Figure 15.1:

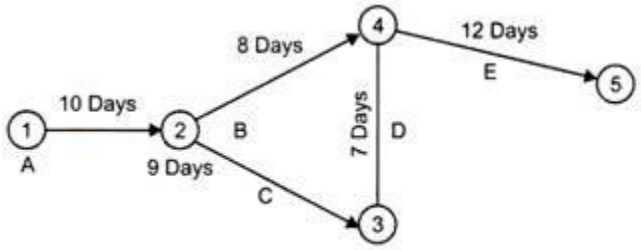


Fig. 15.1 PERT Networking

Advantages of PERT:

PERT technique offers the following advantages:

1. It determines the expected time required for completing each activity.
2. It helps complete the project within a given period of time.
3. It helps management uncertainties involved in the project and thus, reduce the risk element in the project.
4. It enables management to make optimum allocation of limited resources.

5. It presses for the right action, at the right point and at the right time in the organization.

Limitations of PERT:

PERT also suffers from the following limitations**:**

1. PERT network is mainly based on time estimates required for each activity. On account of wrong time estimates, the network is bound to become highly unrealistic.
2. This technique also does not consider the resources required at different stages of the project.
3. For effective control of a project by using PERT technique requires frequent updating and revising the PERT calculations. But, this proves quite a costly affair for the organization.

CPM (Critical Path Method):

Critical Path Method (CPM) is a project schedule modeling technique. Mr. Morgan R. Walker and James E. Kelly developed this technique in the late 1950s.Project planners use this method to develop schedules for many kinds of projects including IT, research, and construction.Critical Path Method is a lengthy and complex concept.The Critical Path Method is defined in the Project Management Body of Knowledge (PMBOK) as follows:

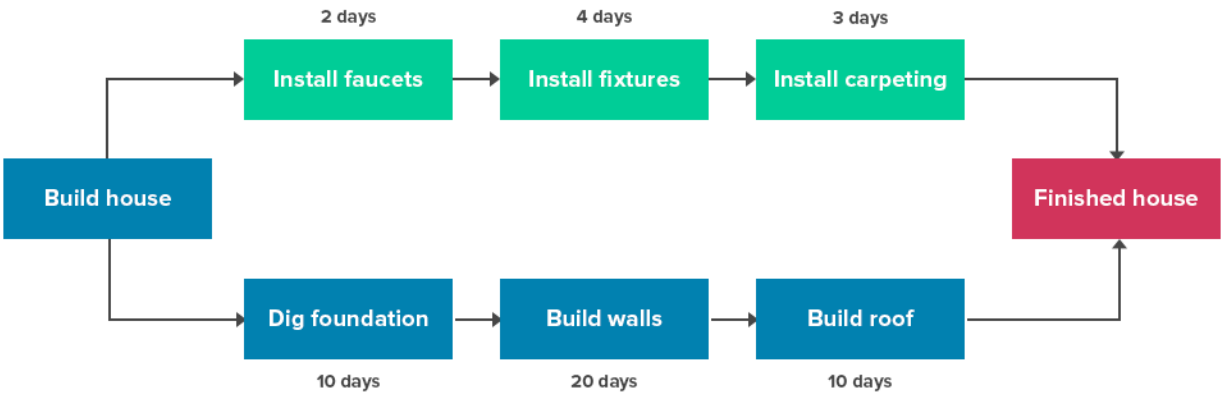
"The Critical Path Method is the sequence of scheduled activities that determines the duration of the project."

These scheduled activities *must* be performed if the project is to be considered a success. Moreover, they must be completed in a specific order. If you're building a house, you can't construct the walls and then dig the foundation; you have to do it in a sequence.

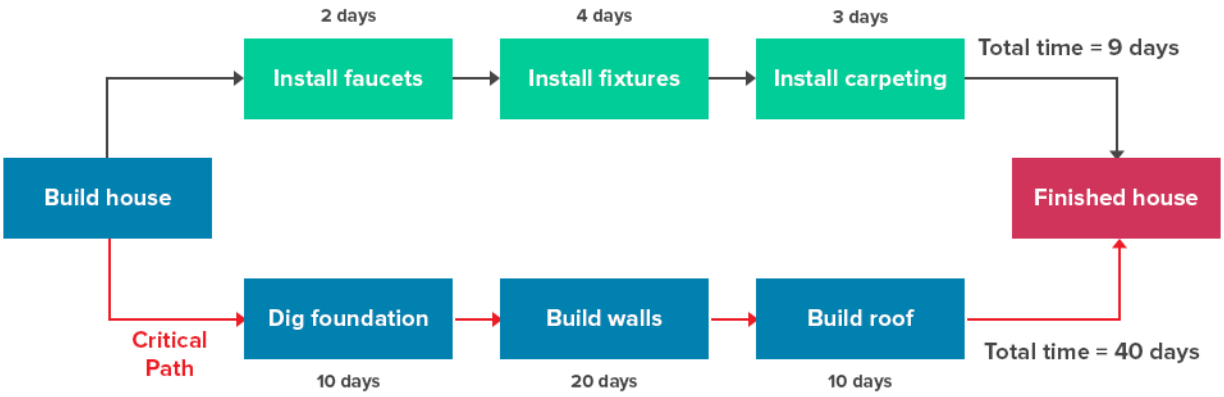
The important bit to understand is that the CPM describes the *longest sequence of tasks* in the project.

That is, in any project, you'll have multiple task sequences. The CPM would describe the sequence that takes the most time.

For example, if you're building a house, you would have several task sequences as follows:



Each task takes a different amount of time and resources. It takes more time to build walls and lay the roof than to install faucets and fixtures.
If you had to figure out the project's 'Critical Path', you would look at the sequence that takes the most amount of time, like this:



The total time taken to complete the sequence along this critical path would give you an idea of the project's *minimum* duration.
You might undertake several task sequences simultaneously, but if there are any delays in the critical path sequence, your project will suffer delays as well.

Critical Path

A network diagram has many paths originating from one point and ending at another point. Every path has a duration and the one with the longest duration is the critical path.
You can define a critical path as:

- The longest path in the network diagram, or
- The shortest duration to complete the project.

The Critical Path Algorithm Explained

At its heart, the Critical Path Method is essentially an algorithm for decision making. This algorithm takes a task's start time, its duration, and finish time to figure out which activities deserve the most attention (i.e. are "critical" for the project).

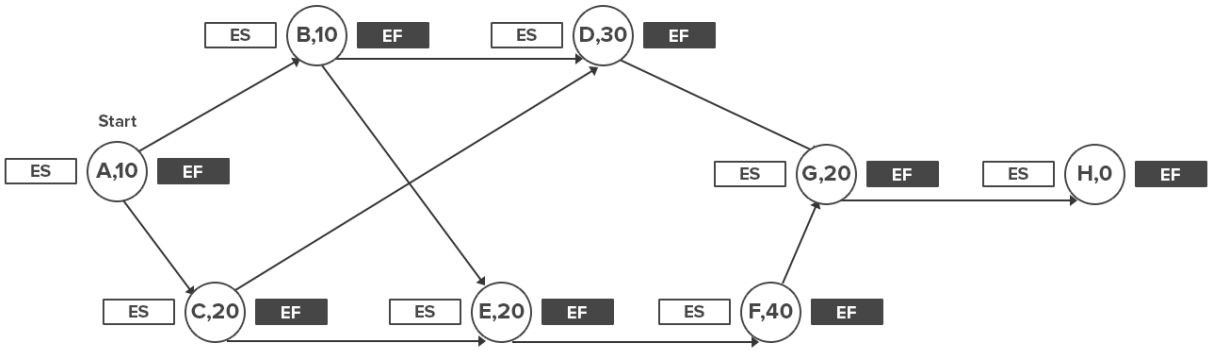
Let's consider an example to understand the critical path algorithm better.

Suppose you have a list of tasks as shown below. Column C and D list the tasks that must be accomplished for the activity to begin, and the duration of the activity, respectively.

Task ID	Task Description	Task Predecessors	Task Duration (hours)
A	Project start		0
B	Buy materials for A	A	10
C	Buy materials for B	A	20
D	Build A	B, C	30
E	Build B	B, C	20
F	Polish and finish B	E	40
G	Join A and B	D, F	20
H	Project finish	G	0

Since the project manager's goal is to complete the project as quickly as possible (without compromising on quality, of course), we'll try to find the earliest finish time for each activity.

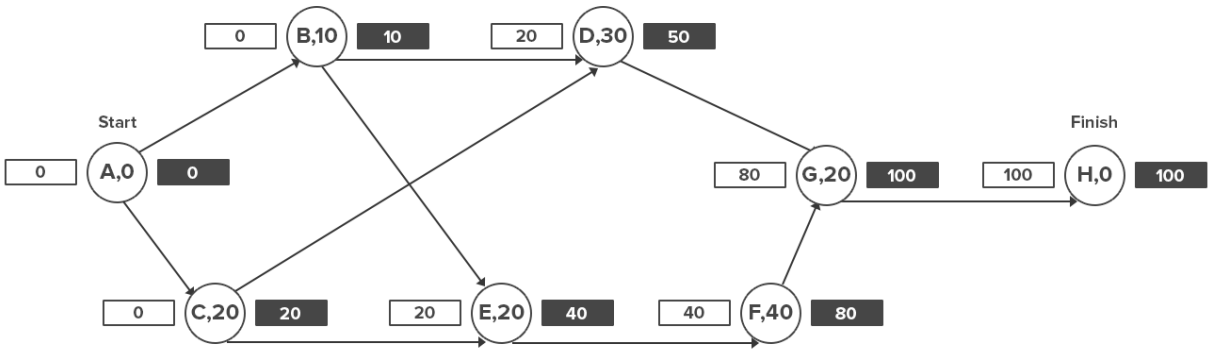
To do this, organize all tasks into a flowchart and note their durations next to the task ID. The arrows indicate the sequence of activities. We'll mark the **Earliest Start (ES)** time to the left of the activity, and the **Earliest Finish (EF)** time to the right.:



Mark the **Start Time (S)** to the left and right of the first activity. Usually, this would be 0.

Now mark the Earliest Start (ES) time of each activity. This is given by the *largest* number to the *right* of the activity's immediate predecessor (i.e. its Earliest Finish time, or EF).

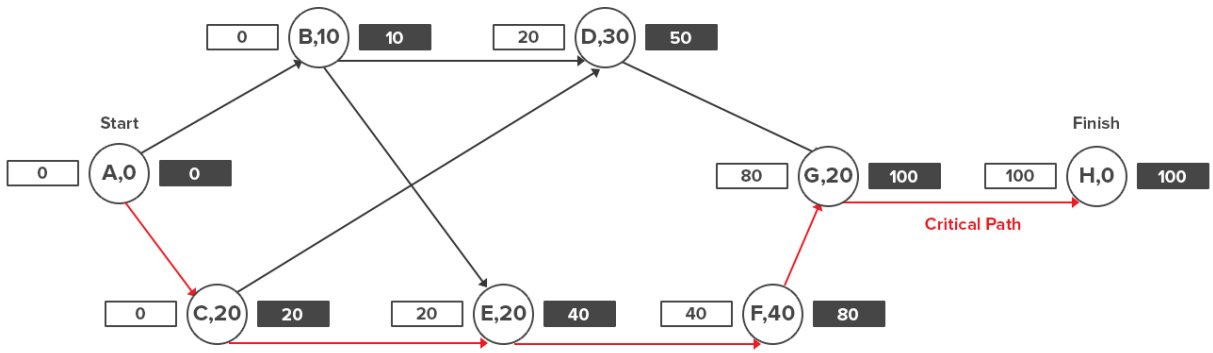
If the activity has two predecessors, the one with the later EF time would give you the ES of the activity.



The EF of an activity is given by its Earliest Start time (ES) and its duration (t), i.e. *ES + t.*

Thus, if an activity's ES is 20 and will last for 10 days, its EF will be 30.

Mark all these figures in the flowchart.



The longest path will be the "critical path".

The final figure to the right of the last task in the sequence will give you the minimum time the project will take to finish.

Float or Slack in Project Management

A concept related to, and crucial for using the Critical Path Method, is *float* or *slack*.In project management, "float" defines the amount of time a task can be delayed by without causing a delay in:

1. Any subsequent, dependent tasks - called "free float"

2. Any delay in the overall project - called "total float"

Any activity or task on the critical path has zero float. That is, you can't delay it at all without causing a delay in the project or dependent tasks.

However, there are plenty of other activities in the project that can be delayed. The quantification of this delay is called the "float".

For example, when you're making an omelet, "Heating the pan" has zero float since it is on the critical path.

Seasoning the eggs, however, has a lot of float. You can add salt to the raw egg mixture, while the eggs are cooking, and even after they've cooked.

Calculating the float or slack of all activities in the project is crucial for better distribution of resources.

If an activity has high float, you can divert its resources to a higher priority task.

Generally speaking, high float activities will be lower down the priority list, while those on the critical path (aka 'zero float' activities) will get prime attention.

Benefits of the Critical Path Method

The following are a few benefits of the Critical Path Method:

- It shows a graphical view of the project.
- You can discover and visualize dependencies.

- It aids in project planning, scheduling, and controlling.
- It helps in contingency planning.
- You can see the critical path and identifies critical activities.
- It helps you assign the float to activities and flexibility to float activities.
- It shows you where you can take action to bring projects back on track.

Drawbacks of the Critical Path Method

Although the critical path is a very useful tool in project planning, it has some drawbacks, such as:

- The Critical Path Method is an optimal planning tool and assumes that all resources are available for the project at all times.
- It does not consider resource dependencies.
- There is a chance of misusing float or slack.
- Less attention paid to non-critical activities, though sometimes they may become critical activities.
- Projects based on the critical path often do not finish on time.

METHOD OF PROJECT APPRAISAL:

Project appraisal is the process of assessing, in a structured way, the case for proceeding with a project or proposal, or the project's viability. It often involves comparing various options, using economic appraisal or some other decision analysis technique. The entire project should be objectively appraised for the same feasibility study should be taken in its principal dimensions, technical, economic, financial, social and so far to establish the justification of the project or The project appraisal is the process of judging whether the project is profitable or not to client.or it is process of detailed examination of several aspects of a given project before recommending of some projects.

Some of the methods of project appraisal are as follows:

1. Economic Analysis:

Under economic analysis, the project aspects highlighted include requirements for raw material, level of capacity utilization, anticipated sales, anticipated expenses and

the probable profits. It is said that a business should have always a volume of profit clearly in view which will govern other economic variables like sales, purchases, expenses and alike.

It will have to be calculated how much sales would be necessary to earn the targeted profit. Undoubtedly, demand for the product will be estimated for anticipating sales volume. Therefore, demand for the product needs to be carefully spelled out as it is, to a great extent, deciding factor of feasibility of the project concern.

In addition to above, the location of the enterprise decided after considering a gamut of points also needs to be mentioned in the project. The Government policies in this regard should be taken into consideration. The Government offers specific incentives and concessions for setting up industries in notified backward areas. Therefore, it has to be ascertained whether the proposed enterprise comes under this category or not and whether the Government has already decided any specific location for this kind of enterprise.

2. Financial Analysis:

Finance is one of the most important pre-requisites to establish an enterprise. It is finance only that facilitates an entrepreneur to bring together the labour of one, machine of another and raw material of yet another to combine them to produce goods.

In order to adjudge the financial viability of the project, the following aspects need to be carefully analysed:

1. Assessment of the financial requirements both – fixed capital and working capital need to be properly made. You might be knowing that fixed capital normally called ‘fixed assets’ are those tangible and material facilities which purchased once are used again and again. Land and buildings, plants and machinery, and equipment’s are the familiar examples of fixed assets/fixed capital. The requirement for fixed assets/capital will vary from enterprise to enterprise depending upon the type of operation, scale of operation and time when the investment is made. But, while assessing the fixed capital requirements, all items relating to the asset like the cost of the asset, architect and engineer’s fees, electrification and installation charges (which normally come to 10 per cent of the value of machinery), depreciation, pre-operation expenses of trial runs, etc., should be duly taken into consideration. Similarly,

if any expense is to be incurred in remodeling, repair and additions of buildings should also be highlighted in the project report.

In accounting, working capital means excess of current assets over current liabilities. Generally, 2: 1 is considered as the optimum current ratio. Current assets refer to those assets which can be converted into cash within a period of one week. Current liabilities refer to those obligations which can be payable within a period of one week. In short, working capital is that amount of funds which is needed in day today's business operations. In other words, it is like circulating money changing from cash to inventories and from inventories to receivables and again converted into cash.

2. This circle goes on and on. Thus, working capital serves as a lubricant for any enterprise, be it large or small. Therefore, the requirements of working capital should be clearly provided for. Inadequacy of working capital may not only adversely affect the operation of the enterprise but also bring the enterprise to a grinding halt.
3. The activity level of an enterprise expressed as capacity utilization, needs to be well spelt out in the business plan or project report. However, the enterprise sometimes fails to achieve the targeted level of capacity due to various business vicissitudes like unforeseen shortage of raw material, unexpected disruption in power supply, inability to penetrate the market mechanism, etc.
4. Then, a question arises to what extent and enterprise should continue its production to meet all its obligations/liabilities. 'Break-even analysis' (BEP) gives an answer to it. In brief, break-even analysis indicates the level of production at which there is neither profit nor loss in the enterprise. This level of production is, accordingly, called 'break-even level'.

3. Market Analysis:

Before the production actually starts, the entrepreneur needs to anticipate the possible market for the product. He/she has to anticipate who will be the possible customers for his product and where and when his product will be sold. There is a trite saying in this regard: "The manufacturer of an iron nails must know who will buy his iron nails."

This is because production has no value for the producer unless it is sold. It is said that if the proof of pudding lies in eating, the proof of all production lies in

marketing/ consumptio. In fact, the potential of the market constitutes the determinant of probable rewards from entrepreneurial career.

Thus, knowing the anticipated market for the product to be produced becomes an important element in every business plan. The various methods used to anticipate the potential market, what is named in 'Managerial Economics' as 'demand forecasting', range from the naive to sophisticated ones.

4. Technical Feasibility:

While making project appraisal, the technical feasibility of the project also needs to be taken into consideration. In the simplest sense, technical feasibility implies to mean the adequacy of the proposed plant and equipment to produce the product within the prescribed norms. As regards know-how, it denotes the availability or otherwise of a fund of knowledge to run the proposed plants and machinery.

It should be ensured whether that know-how is available with the entrepreneur or is to be procured from elsewhere. In the latter case, arrangement made to procure it should be clearly checked up. If project requires any collaboration, then, the terms and conditions of the collaboration should also be spelt out comprehensively and carefully.

In case of foreign technical collaboration, one needs to be aware of the legal provisions in force from time to time specifying the list of products for which only such collaboration is allowed under specific terms and conditions. The entrepreneur, therefore, contemplating for foreign collaboration should check these legal provisions with reference to their projects.

While assessing the technical feasibility of the project, the following inputs covered in the project should also be taken into consideration:

(i) Availability of land and site.

(ii) Availability of other inputs like water, power, transport, communication facilities.

(iii) Availability of servicing facilities like machine shops, electric repair shop, etc.

(iv) Coping-with anti-pollution law.

(v) Availability of work force as per required skill and arrangements proposed for training-in-plant and outside.

(vi) Availability of required raw material as per quantity and quality.

5. Management Competence:

Management ability or competence plays an important role in making an enterprise a success or otherwise. Strictly speaking, in the absence of managerial competence, the projects which are otherwise feasible may fail.

On the contrary, even a poor project may become a successful one with good managerial ability. Hence, while doing project appraisal, the managerial competence or talent of the promoter should be taken into consideration.

Research studies report that most of the enterprises fall sick because of lack of managerial competence or mismanagement. This is more so in case of small-scale enterprises where the proprietor is all in all, i.e., owner as well as manager. Due to his one-man show, he may be jack of all but master of none.