Unit - III
PRODUCTION FUNCTION

Production is an important economic activity, which directly or indirectly satisfies the wants and needs of the people. It is concerned with the supply side of the market. The standards of living of the people depend on the volume and the variety of goods produced. Richness or poverty of the nation and performance of the economy is judged by its level of production. Those nations which produce commodities and services in large quantities are considered rich and others which produce less are considered poor.

Production is the transformation of inputs into the output of commodity or several commodities (in case of point production) in a specific period of time at the given state of technology. In production process, even both input and output may be intangible. Thus, the word production in economics is not simply confined to effecting physical transformation in the matter, it also covers rendering of services such as transporting, financing, wholesale, retailing, packaging, etc. In a broad sense, production implies the creating or addition of form, place and time utilities by the production and storage, distribution of different usable commodities and services. Utility of a commodity may increase due to several reasons.

Form Utility

If the physical form of a commodity is changed, its utility may increase. For instance, the utility of cotton increases, if it is converted into clothes. The other examples are processing of paddy into rice, wheat into flour and butter into ghee.

Place Utility

If a commodity is transported from one place to another, its utility may increase. For instance, if rice is transported from Tamil Nadu to Kerala, its utility will be more.

Time Utility

If the commodity is stored for future usage, its utility may increase. During rainy season, water is stored in reservoirs and it is used at a later time. This increases the utility of that stored water. Agricultural commodities like paddy, wheat, oilseeds, pulses are stored for the regular uses of consumers throughout the year.

Possession Utility

Commodities in the transaction process, change from one person to another person. Commodities in the hands of producers have some utility and by the time they reach consumers through the traders their utility is increased. Such utility due to possession or transfer of ownership of the commodity is called, possession utility. For example, paddy in the hands of producers, i.e. farmers has less utility compared to that of the rice in the hands of consumers.

Production enhances the utility of the product by changing it to the form in which the consumers need it. Distribution through transportation increases the usefulness of the product by bringing it to the location where the consumer needs it. In the absence of transportation, the product may be just as useful to the consumer as it would be if it were still a collection of raw materials. Likewise, storage gets the product to the consumer when he needs it.

FACTORS OF PRODUCTION

After the analysis of the demand situation of product, firms as economic agents face the problem of the organization of the resources to meet the possible production goals. These resources (raw materials and factor services) known as inputs at one end, and the finished goods and services known as outputs, emerge at the other end. These inputs may be regarded as being combined to produce the output or being used up (or sacrificed) in order to gain the output.

The product of one industry may be used in another industry. For example, coal is the product of a colliery, but, when it is used in a factory, it becomes a factor of production. Similarly, wheat is output for a farmer, but, when it is used to produce bread, it becomes a factor of production. Thus, a firm buys the inputs for use in its production, whereas it produces or processes the output for sale.

Each distinct input into the production process can be regarded as a factor of production. All these factors of production help in the process of production. For example, for the production of garments, piece of land is required to build a factory, where the production takes place. This also requires the services of labour. Capital is required to meet capital expenditure on the purchase of machines, tools, etc. and for incurring recurring operating expenditure on raw materials, fuel, power etc. Finally, the services of entrepreneur are required to organize, supervise and coordinate the whole process of production including the services of land, labour and capital. These are (four) primary inputs in the sense that they participate in the production activity in the first instance.

A distinction is required to be made between the factors of production and the services which they render in production. When a producer hires a factor of production, it is not the factor but his services that are bought.

The traditional fourfold classification of factors of production, viz. land, labour, capital and entrepreneur is modified by several economists. To some, organization is not a separate factor of production, since it is only a type of labour. While some others consider only two factors of production viz. capital and labour. Here, capital includes land and labour includes entrepreneur also. At the extreme, karl marx emphasized only one factor of production, i.e. labour. In his view, land cannot produce anything by itself, unless it is used by man. Further, capital is man-made and is the embodiment of labour. Finally, entrepreneur is not a separate factor of production; rather it is a form of labour. Therefore, all factors of production are reducible to labour. However, it will be convenient to classify all factors of production under the four heads. It will also be useful to study the distribution of incomes as rent for land, wages of labour, interest on capital and profit to entrepreneur. These four factors of production are briefly discussed here.

1. Land

Marshall defines the term land as, “the whole of the materials and forces which nature gives freely for man’s aid in land and water, in air, light and heat”. Thus, the term land is used in a broader sense, which includes all raw materials or those which are free gift of nature used for the satisfaction of our wants or for the production of goods and services. It does not simply refer to land in the ordinary sense of the term, but also resources like forests, lakes, seas, waterfalls, rainfall, mountains, climate, weather, sunshine, minerals, air, etc. Land includes not only the land used for agricultural or industrial purposes, but also all the national

resources taken from above or below the soil. Thus, land represents the sum total of natural resources available to the economy. These natural resources have value, because they are useful and these are scarce. Following are the important peculiar characteristics of land.

(a) **Fixed Supply:** The supply of land is fixed, predetermined by nature. Man cannot add to it through his efforts. An individual may get more of land by paying for it, the society as a whole cannot increase its availability. However, man may discover unknown natural resources, like mineral deposits. New uses of known resources can also be found. Multiple cropping (or rotation of crops) is another alternative. The Dutch added some land surface by drying up sea. However, it is not an addition of land in the true sense of the word, since, the land was already there. Similar explanation can be given for the reclaimed marshy and weed infested land brought under cultivation.

(b) **Price of Land:** Though land is free gift of nature with fixed and limited supply, it is not available free of cost. Market price of land comes into existence as economic arrangements like private ownership and inheritance. However, man might not have paid any price for the land acquired by him in the initial stages.

(c) **Original and Indestructible Powers:** Land has original and indestructible properties in the sense that location and even fertility is given by nature and cannot be destroyed. Even when a particular area loses its fertility and productivity for some reason, man can restore or improve the productivity through manure, irrigation and drainage system or by leaving the land uncultivated for some time or otherwise. It can also be rendered fully or partially unproductive through its constant use.

(d) **Immobile:** Unlike other factors of production, land is permanent and immobile. It can not be taken to other places, resulting in wide variations in land rents at different places. Though land lacks geographical mobility, it can be put to different uses. For example, land can be used for cultivating rice, wheat or even as a building site.

(e) **Heterogeneity:** Land is not homogeneous. No two pieces of land are exactly same in fertility. Some lands are fertile, while others are marshy, rocky and barren, unfit to yield any crop. Further, lands differ in situations. Land situated in the heart of city or near the market, railway station, aerodromes etc. will have move value because of better location than sites in the suburbs.

2. Labour

The term labour may be defined as any action of mind or body, which is undertaken with a view to earn some monetary reward. In the words of Marshall, "by labour is meant the economic work of a man, whether with the hand or with the head ".

The concept of labour, however, is confined to only human effort and the work performed by animals and machines is not considered as labour.

In common parlance, labour stands for unskilled labour, but, in economics, it stands for all labour which is used in the production of goods and services. It includes skilled and unskilled labour, manual (physical) and mental labour, technical and non-technical labour, ordinary and managerial labour, and those employed in education, government, administration, justice, etc.

Every labour which is paid for his services is generally a productive labour. But, gamblers, thieves, speculators, professional chests etc. included in anti-social activities are unproductive; no matter they get money more than those, who are employed in legitimate jobs.

It is important to note that labour as an input cannot be separated from its supplier. In most of the cases, this factor is to be present and offer the service personally. It is in this sense that labour is distinct from other factors of production like land, capital and organization. All these factors are separate from their supplier. But, labour and labour services are inseparable. Further, labour is perishable as against other factors. It cannot be stored. If a labourer does not find work on a particular day, his labour is wasted for that day. Labour not performed is lost forever. So, its performance cannot be postponed. For his reason, bargaining power of workers is poor, and they are forced to accept low wages (minimum subsistence wages) or go without it. Now, the bargaining power and economic condition of workers are improving by the formation of trade unions and labour laws. Social security measures have also been adopted to safeguard their interests.

Volume of labour cannot be changed in response to change in demand. Natural factors like war, epidemics, may sometimes even reduce the availability of labour. Thus, increase or decrease in volume of labour is a natural phenomenon and doesn't have any direct relation to its demand. Further, supply curve of labour is backward sloping. Workers would like to earn a certain minimum income to maintain their standard of living. If wages rise beyond their accustomed standard of living, they are tempted to enjoy more leisure, thereby causing contraction of supply of labour. When wages fall below the level of standard of living, workers work harder and increase the number of hours they are prepared to work. For this, some non-working members of the family may take up the work to earn sufficient income to maintain the standard of living of the family. Thus, it is clear that supply of labour may contract, when wages rise and vice-versa. In other words, changes in price of labour have reverse effect on its supply as against other factors of production.

There are a large variety of workers both skilled and unskilled depending upon their health, age, intelligence, social background, education level, experience etc. Different workers (even unskilled ones) have different productive capacities. Further, each worker is not equally productive in different jobs. This difference is more among skilled workers for a specific job. Education, training, skill, health, climatic conditions, organizational set-up and personal qualities affect the efficiency of labour, while his intensity is intensity is determined by the willingness of labourer to work without wasting time and effort. Willingness of worker depends, upon-several factors like general, social atmosphere, loyalty towards job, wage rate and other factors.

Labour exhibits certain peculiarities and is different from other factors. Land and capital cannot produce anything without the services of labour. Further, since capital can be invested in labour, the latter may be called as human capital. It is mobile and can be considered not only a means but also an end, since production is carried on for the sake of human beings. Finally, due to the personal nature of labour, the economic considerations alone are not sufficient. The conditions and surroundings under which the worker works are also important and affect the productivity of the labour.

3. Capital

Labour and land are the two primary factors of production to facilitate production. Labour cannot work, unless there is land to work upon. Similarly, land cannot produce any thing by itself, but requires labour to act on it. These two factors are used to produce capital, which is a highly mobile factor of production. Thus, capital is produced by man (labourer) working on nature (land). It is a man made productive resource. In the words of Bohm Bawerk, capital is the produced means of production. Thomas defines it as "wealth of individuals and communities other than land which is used to assist in the production of further wealth." According to Marshall, "capital consists of those kinds of wealth, other than free gifts of nature, which yield income." It is that part of wealth, which is used for further production of wealth. It appears in various forms like plant and machinery, tools, building, roads, dams, bridges, means of transportation and communication, etc. These capital goods have limited life. However, supply of capital is not fixed in short period. It can be varied. As capital is the result of human labour diverted to the production of goods and services meant for further production, instead of goods meant for consumption, there is no limit to which it can be accumulated. This process of addition of capital stock is called as ***capital formation***.

Capital formation plays a vital role in the process of economic development of a country. Large investments in capital project are required for the growth of an economy .As in the process of production, capital stock is reduced, and capital accumulation during a given period must exceed the amount used in production during that period to raise the output, income and employment in a country. Further, process of development requires training and skill of labour to improve its productivity. Thus, capital on one hand makes available means of production for production of goods in future. On the other hand, it provides job opportunities and improves the quality of labour. Finally, capital makes available resources to producer to make payments for labour, raw materials, machinery, transport and other selling expenses including advertisement cost. With the industrial revolution and replacement of simple primitive techniques of production by expensive ones, this factor has become relatively more important.

4. Entrepreneur

It is that factor of production, which organizes plans and brings together all the factors of production. Entrepreneur is the employer of the factors of production. He produces goods and services after supervising and coordinating the activities of the various factors of production. He also makes payments to the factors for their contribution in the production process. The entrepreneur is distinct from other factors of production in the sense that he is not employed by anyone. He gets profit (if any) for managing the business in an atmosphere of business risk and uncertainty. His profit reward is residual, while he has to make fixed contractual payments to other factors of production. He may even suffer loss (negative profit); in case these contractual payments exceed the revenue from the sales of goods and services.

The entrepreneur has to take all business decisions including line as well as scale of production, selection of plant site, optimum combination of factors, market research,

advertisement outlay, demand forecasting, etc. In short, he is the one who must take all decisions regarding the organization, the running and the management of the business. He also represents the business before the government or with other enterprises. The entrepreneur is often loosely identified with the owner of a business, a speculator, an inventor or innovator and on organizer of the business. However, he should better be identified with organizer, who does not simply bear the risk, but introduces innovations also. Further, he not only invents, but goes much further in exploiting the invention commercially.

The entrepreneur plays a vital role in production in the modern era. Those days have gone, when the production was simple and was carried on in small workshops or even in houses. On account of small scale production, the worker used to supply capital including tools and equipment himself, owned his land or house to carry on production and planned all the operations of purchase of raw materials and sale of goods. In modern times, the production process has become very complex and the factors of production are owned separately. It, therefore, becomes necessary for someone with vision to act as a boss and decide as to how the business should run. Such person, known as entrepreneur takes all major decision regarding the organization and management of the business. He is looked upon as an indispensable factor of production. The importance of entrepreneurship is increasing day by day because the inherent elements of risks have considerably gone up in modern complicated production. The greater is the element of risk, the greater is the need for entrepreneur of caliber and competence. The success of any business depends on the efficiency of the entrepreneur, that is, the capacity to produce maximum cost. Following are the requisite personnel qualities in an efficient entrepreneur:

(a) **Foresightedness:** He should be able to forecast the demand of the product accurately.

(b) **Self Confidence:** The entrepreneur should not lose confidence in difficult situations like labour troubles, disputes, depressions, stiff competition, government policy, power break down, etc. He should rather face such situations boldly and with confidence.

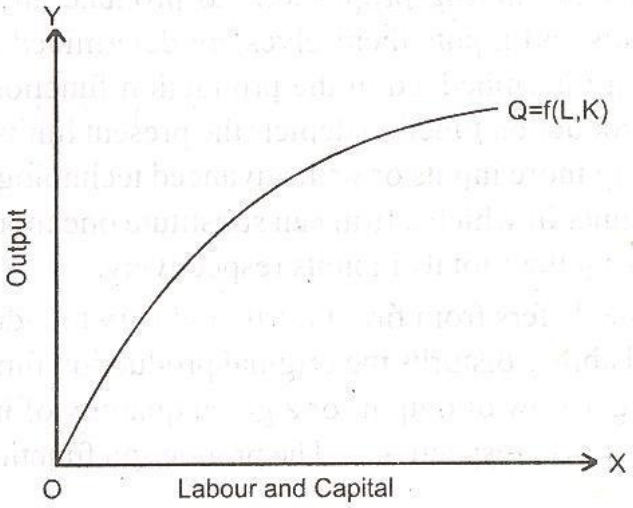
(c) **Knowledge of Business:** He should be familiar with the intricacies of the business and psychology of the workers to handle the situation properly and establish industrial peace.

(d) **Leadership:** Being captain of the business, the entrepreneur must have the quality of leadership and the power to take quick decisions.

PRODUCTION FUNCTION

Production, as said before is the transformation of inputs into outputs at the given state of technology. Output is, thus, a function of inputs. Technical relation between physical inputs like capital and labour (factors of production) and the physical outputs is depicted by production function (fig. 3.1)

Fig. 3.1



Production function denotes an efficient combination of inputs and output. It shows for a given technological knowledge and managerial ability, the maximum amount of a good that can be obtained from different combinations of productive factors per unit of time or minimum quantities of various inputs required to yield a given quantity of output. Thus, production function is a catalogue of output possibilities. Prices of factors or of the product do not enter into the production function.

Mathematically, it can be expressed in the form of an equation.

$$Q = f(K, L, L, O)$$

Q stands for the quantity of output. K, L, L and O stand for the quantities of capital, labour, land and organization (factors of production) respectively used in producing output. Output quantity, thus, depends on the quantities of these inputs. The above production function describes the technological or engineering relationship involved between the factors of production and the resultant output of a commodity.

The production function of a firm shows the technical methods available to produce a given output of a commodity by combining the factors of production in various possible ways. A rational producer always uses technically most efficient method of production. A method of production said to be technically more efficient than other methods, if it uses less of at least one factor input and no more of the other factor inputs to produce one unit of the commodity. Suppose the two methods of production P1 and P2 require 2 and 2 units of labour, while 3 and 4 units of capital respectively. Here the rational producer will choose method P1 to produce the commodity, since it saves on unit of capital without using more amount of labour. Hence, this method is economical and more efficient. The theory of production considers only efficient methods.

However, it is often not possible to directly compare the production processes, when production of a commodity requires more of some factor and less of some other factor (s) as compared with any other production process. Suppose, the production method P3 requires 3 units of labour and 4 units of capital, while production method P4 require 4 units of labour and 3 units of capital. Here, neither of the two production methods is more efficient than the other. Since the two methods are not directly comparable, they are considered as technically efficient and included in the production function. The choice of a particular method will depend on the prices of factors. This choice of a particular production method among several technically efficient methods for decision making at the firm level is an economic one rather than technical. Therefore, a technically efficient production method need not be an economically efficient method.

The production function expresses the way output is produced by inputs and the way inputs cooperate with each other in varying proportions to produce any given output. These relations between inputs and outputs and inputs themselves are determined by technology that rules at any given time. The technology is embedded in the production function, which acts as a constraint on decision making. Thus, production function depicts the present limits of the firm. A firm can produce higher output only by using more inputs or with advanced technology. At the same time, production function indicates the manner in which a firm can substitute one input or output (as the case may be) for the other without altering their total amounts respectively.

Production function differs from firm to firm, industry to industry. Any change in the state of technology or managerial ability disturbs the original production function. New production function may have a smaller or larger flow of output for a given quantity of inputs in case of deterioration or improvement in the state of firm respectively. The production function shifts downwards/ upwards in the two cases respectively.

Production function can be represented in various forms. It can be represented by schedules, tables, input-output tables, graphs, mathematical equations total, average and marginal product curves, isoquants (equal product curves) and so on.

TYPES OF PRODUCTION FUNCTIONS

The formulation of the production function is a highly technical job. It is an engineering concept, which should be undertaken by those persons, who possess the necessary technical and engineering knowledge relevant to firm or industry in question. Certain pioneer studies were made in the field of agriculture of the measurement of production function. Various production functions can be formulated on the basis of statistical analysis of the relationship between changes in physical inputs and physical outputs.

1. Fixed- Proportions and Variable- Proportions Production Functions

When the amount of a productive factor required to produce a unit of product (i.e. , technical coefficient) remains fixed irrespective of the level production , the production function is of fixed proportion form .Thus , the factors of production , say ,

labour and capital , must be used in definite fixed proportion in order to produce a given level of output . Here, the possibility of substitution of the factors of production is ruled out. As it happens in the long-run, it is called as ***long – run production function.***

On the other hand, when the amount of a factor required to produce a unit of product can be varied by substituting some other factor in its place, the production function will be of variable proportions form. Most of the commodities in the real world are produced under conditions of variable proportions production functions. In case of variable proportions production function, a given amount of a product can be produced by several alternative combinations of factors. As it happens in the short – run, it is called as ***short –run production function.***

CONCEPT OF PRODUCT

In the theory of demand, individual consumer was considered as an economic unit. Similar to that, in the theory of production, individual firm or industry is the economic unit. ***Product or output refers to the volume of goods produced by a firm or an industry during a specified period of time***. The product can be looked at from three different angles (a) total product, (b) marginal product and (c) average product.

Total Product

The total quantity of goods produced by a firm (or a factor) during a specified period of time is called its total product; total product of a firm can be raised only by increasing the quantity of the variable factor. Generally, total product goes on increasing with an increase in the quantity of factor employed in product. But, the rate of increases in total product varies at different levels of employment. As can be seen from Fig. 3.2 (given ahead), total product rises at increasing rate in the beginning, with increase in the employment of the factor. This fact has proved to be valid both by theory and empirical evidences.

Increase in the variable factor of production will not always increase the total product. For example, employment of workers beyond the capacity of the factory will cause over-crowding. In such a situation, labour will not be in a position to work most efficiently. Thus, the total product curve slopes steeply upward at first, then flattens out and finally declines. Initially, it is convex from below and then concave from below.

Marginal Product

Marginal product of a factor is the addition to the total production by the employment of an extra unit of a variable factor. For example, when 9 workers were employed in Frontier Biscuit factory Pvt. Ltd. total production of biscuits was 10,000. Now, if one additional worker is employed, total production rises to 10,500 biscuits attributable to 10 workers. Since tenth worker has added 500 biscuits to the total production, the marginal product of tenth worker is 500 biscuits.

The formula for marginal product is

$$MP_n = TP_n - TP_{n-1}$$

Where, TP is the Total Product, 'n' is the number of variable factor units and MPn is the Marginal Product of the nth variable factor unit.

Average Product

Average product of a factor is the total product (or output produced) divided by the total number of units of a variable factor. Thus,

$$AP = \frac{TP}{\text{Number of units of variable factor}}$$

FIXED FACTORS AND VARIABLE FACTORS

Production is the result of combined efforts of the factors of production. These factors may be fixed or variable .A fixed factor is one, whose quantity cannot readily be changed in response to desired changes in output or market conditions. Its quantity remains the same, whether the level of output is more or less zero. Building, land, machinery, plants and top management are some common examples of fixed factors. A variable factor, on the other hand, is one whose quantity may be changed in response to a change in output. Raw materials, ordinary labour, power, fuel, etc. are examples of variable factors. Such factors are required more, when output is more, less, when output is less and zero, when output is nil. For the sake of analytical simplicity, semi-variable factors are not considered here.

The distinction between fixed and variable factors is related to two periods- the short-run and long-run. The period of short –run is too short to cause variation is fixed factors. Thus, in the short-run, some factors are fixed, while the others are variable. The production can be increased only by increasing the quantity of the variable factors or by having additional shifts or by increasing the hours of work. But , in the long-run (also called as planning period of the firm), all the factors are variable, i.e. the quantity of all the factors required can be varied to produce an output ranging from zero to an indefinite quantity. All investment options are open including installation of new plant and machinery. In the long run, it is possible for a firm to branch out into new products or new areas or to modernize or reorganize its method of production through invention of new techniques.

The distinction between fixed and variable factors helps us to study the law of variable proportions and the law of returns of scale. These laws of production show the relationship between the factors of production and output in the short run and long run respectively.

LAW OF VARIABLE PROPORTION

The law of variable proportions is one of the most important, fundamental and unchallenged law of production. This law is also termed as **return to a factor**, as under it one factor is varied, while keeping all other factors fixed. With these variations in the quantity of one factor, keeping the quantity of other factors constant, the ratio of employment of the variable factor to that of the fixed factor keeps on changing. As we study the effects of variations in factor proportions under this law, this is called the **law of variable proportion.**

The law of variable proportions states that, as we use more and more units of some factors of production to work with one or more fixed factors, the total product will increase at an increasing rate, then at a constant rate and finally at a diminishing rate. In other words, the marginal, average and total product will rise up to a certain stage and then will decline. The law has been stated by various economists in the following words:

"As the proportion of one factor in a combination of factors is increased, after a point first the marginal and then the average product of that factor will diminish". –F.Benham

"An increase in the some inputs relative to other fixed inputs will, in a given state of technology, cause output to increase; but after a point the extra output resulting from the same additions of extra inputs will become less and less". –P.A.Samuelson

Law of variable proportions is based upon the following **assumptions:**

(i) The state of technology is given and remains constant. If there is improvement in technology, then marginal and average products may rise instead of diminishing.

(ii) Quantity of at least one factor input is constant and one factor input is variable. It is only in this way that the firm can alter the factor proportions and know its effects on output.

(iii) Effect of changing units of a variable factor on output can be estimated correctly.

(iv) The law is based upon the possibility of varying the proportions in which the various factors can be combined to produce a product. The law does not apply in those situations, where the factors must be used in fixed proportions to yield a product. In such situations, increase in one factor would not lead to any increase in output i.e. the marginal product of the factor will be zero and not diminishing. For example, two drivers cannot drive the same vehicle at the same time. However, such situations are very uncommon.

(v) All the units of variable factor are homogenous, i.e. equal in efficiency.

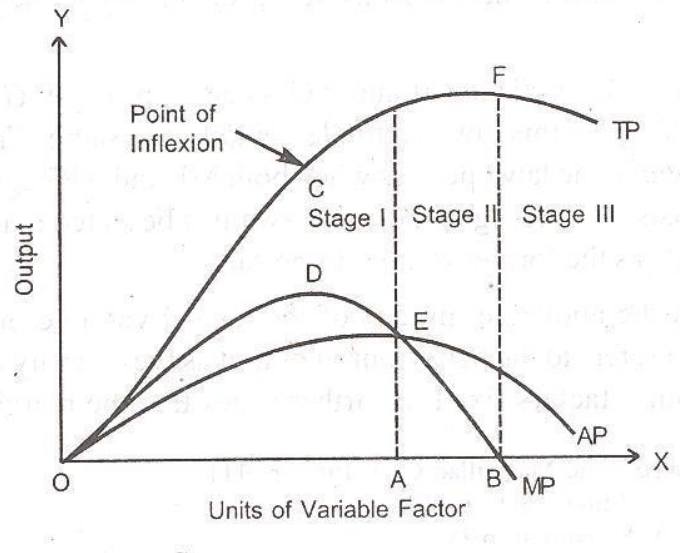
(vi) Input prices remain unchanged.

The following table explains the operation of the law of diminishing returns:

Units of Labour	Total product (in quintals)	Marginal Product (in quintals)	Average Product (in quintals)
1	20	20	20
2	30	10	15
3	38	8	12.6
4	44	6	11
5	48	4	9.6
6	50	2	8.3

The above table shows that cultivator employs more and more units of labour to get more produce. One unit of labour gives a total product of 20 quintals. When two units of labour are employed, the total product rises to 30 quintals. The marginal product (i.e. addition to total product with employment of one additional factor) in this case is 10 quintals. When one additional unit of labour is further employed, the marginal product becomes 8 quintals which is less than the marginal product in the previous situation. With each successive increase in the units of labour, the total product increases, but, at a decreasing rate. In other words, the marginal product diminishes with employment of additional units of labour. Fig.3.3 depicts the operations of the law of diminishing returns.

Fig. 3.3



Curve DB in the figure has a negative slope. Thus, more units of labour (variable factor) provide diminishing marginal product.

Three Stages of Law of Variable Proportions

In the short run, output may be varied by varying the quantity (quantities) of the variable factor (s), while keeping the quantity (quantities) of other factors constant. The behaviour of output in such situation actually falls into three distinct stages. In fig. 3.3 we have graphically illustrated the production function with one factor variable (for the sake of convenience), while all other factors are held constant. Quantity of the variable factor is shown on the X-axis and total product, average product and marginal product are measured along the Y-axis. The variations in the total, average and marginal product by varying the quantity of variable factor are shown in this figure. Here, total product (TP) goes on rising to a point and after that it starts falling. Average and marginal product curves also rise and then decline. However, marginal product curve falls earlier than the average product curve. Three stages of the law are explained here.

Stage I (Stage of Increasing Returns)

In this stage, total product increases at an increasing rate to a point 'C' It is clear from the Fig. 3.3 , where the slope of the total product curve (TP) increases upto the point 'C' (TP curve is concave upwards upto the point 'C'). Thus, marginal product rises upto point 'D', vertically downwards to point 'C'. This shows that the firm is moving towards optimum combination. Rising marginal product also pulls up the average product. From the point 'C' onwards during the stage I, the total product continues to rise, but, at a diminishing rate (total product is concave downwards), i.e. marginal product falls, but, is positive. The point 'C' where the total product stops rising at a diminishing rate is called the point of inflexion. The average product, however, will continue to rise even after the point on inflexion, as marginal product (though falling) exceeds its average product. Rising average product indicates increase in the efficiency of labour. The marginal product of the variable factor is equal to the average product of the factor at point 'E'.

The stage I end, where the average product reaches its highest point. So, here, efficiency of labour is maximum. This stage is know as the stage of increasing returns, as average product of the variable factor rises throughout the stage and marginal product of the variable factor rises in a significant part of this stage.

In stage I, total product is not fully utilized. The quantity of the fixed factor is too much relative to quantity of variable factor so that if some of the fixed factors are withdrawn, the total product would increase. Thus, in the first stage, marginal product of the fixed factor is negative. No rational producer will choose to produce in this stage even if the fixed factor costs nothing (in which case, he will stop at the end of first stage, i.e. at point A). Producer can expand production by increasing quantity of the variable factor and make efficient use of the fixed factor.

Stage II (Stage of Diminishing Returns)

In stage II, the total product continues to increase at a diminishing rate, until it reaches the maximum point 'F', where the second stage ends. In this stage, both the average product and marginal product of the variable factor are diminishing (but not negative).That is why, this stage is known as the stage of diminishing returns. With falling average product curve, efficiency of variable factor decreases and that of fixed factor continues to rise. The average product of the variable factor exceeds the marginal product of the factor throughout this stage.

At the end of second stage, i.e. at point 'B' marginal product of the variable factor is zero (corresponding to the highest point 'F' of the TP curve). ***This stage is very crucial. It is the stage of operation***. A rational producer will always seek to produce in this stage, where both the average and marginal product are falling.

In the words of Joan Robinson, "The Law of Diminishing Returns as is usually formulated, states that with a fixed amount of any factor of production, successive increases in the amount of other factors will, after a point, yield diminishing increments of output."

Stage III (Stage of Negative Returns)

In stage III, total product declines. So, marginal product of the variable factor becomes negative and falls below the X-axis. This stage is called the stage of negative returns, as total product, average product fall during this stage and the average product of the variable factor is non-negative. In this stage, efficiency of variable as well as fixed factor declines and factor ratio is highly sub-optimal.

Stage of Operation

The stage I and III are similar. In stage I, the fixed factor is too much relative to the variable factor and so marginal product of fixed factor is negative. In stage III, variable factor is too much relative to fixed factor. Therefore, in this stage marginal product of the variable factor is negative. This stage is ruled out on the ground of technical inefficiency. Thus, a rational producer will never produce in stage III. Even if the variable factor is free, the producer will stop production at the end of second stage, where the marginal product of variable factor is zero. Here, the producer will be maximizing the total product and will be making maximum use of the variable factor.

It is thus clear from the above discussion that the rational producer will never choose to produce in stage I or III. Both of these stages are called stages of *economic absurdity or economic nonsense*. These stages represent non-economic regions in production function. Stage II represents the range of rational production decision. The particular point of production depends upon the prices of the factors. The lesser is the price of fixed factor relative to that of variable factor (due to

relative scarcity of variable factor), the chosen point of production will be closer to the beginning of stage II and vice versa. In extreme case, where the fixed factor is free and variable factor is to be paid for, the firm will choose to produce at the point where the stage II begins. Similarly, when variable factor is free and the fixed factor is to be paid for, the firm will choose to produce at the point, where the stage II ends.

Causes for Increasing Returns

When every addition of the variable factor (i.e. labour and capital) causes more than proportionate increase in output. It is said to be the operation of law of increasing returns. There are two important reasons for increasing returns. (i) Indivisibility and (ii) specialization.

(a) **Indivisibility:** Generally, the fixed factors which are combined with variable factors are indivisible. Such factors cannot be divided into smaller units, since division will result either in total uselessness or partial loss in efficiency. These indivisible factors produce smaller or larger quantities, almost with the same amount of expenditure. In the words of stonier and Hague, "Most factors of production can be most efficiently employed at the output they were designed for and work less efficiently at smaller outputs because they cannot be divided into smaller units. They are indivisible. A manager cannot be chopped in half and asked to produce half the current output. Plant cannot be used less fully without being used economically.''

Indivisibility of a factor means that due to technological requirement, a minimum amount of that must be employed, whatever the level of output. In initial stages, the supply of the fixed factor is too large and it is indivisible. On the other hand, the variable factor units are too few. Thus, the fixed indivisible factor is not efficiently employed. When the units of the variable factor are increased and combined with this fixed factor, the latter is utilized better and more fully. This causes increasing returns, which continue till the best proportion between the fixed factor and variable factors is reached.

(b) **Specialisation**: Another cause for increasing returns is the advantages offered by specialization. The greater the quantity of the variable factor, the greater the scope of specialization. The most important advantages of specialization of labour include greater skill, productivity, efficiency, the avoidance of waste of time in shifting from one task to another, the employment of persons best suited to particular type of work, etc. In assembly line production, cost of production is drastically reduced due to division of labour and specialization. Each worker acquires manual dexterity and proficiency in the job assigned. It improves the quality of product produced and saves time.

Causes for Diminishing Returns

The stage of diminishing returns, like that of increasing returns, can be explained on the basis of indivisibility of factor. Once the optimum proportion between the fixed and variable units has been achieved, with further increase in the

variable factor, fixed factor becomes inadequate relative to the quantity of variable factor. Consequently, average product and marginal product will diminish, because, the indivisible factor is being used too fully, i.e. in non- optimal proportion with the variable factor. Thus, diminishing returns are due to increasing inefficiency of production after the maximum capacity of the indivisible factor has been reached and the limit to specialization has crossed. Diminished returns also arise as after sometime, the firm (or industry) will have to use inferior factor units, when superior ones are used up.

Causes of Negative Returns

As the amount of variable factor continues in increase with fixed amount of other factor, a stage is reached, when the total product declines and the marginal product becomes negative .The phenomenon of negative returns is due to the fact that the number of the units of variable factor become too excessive relative to the fixed factor, so that they get in each other's way, with the result that the total product starts falling. Besides, too large a number of the variable factors impair the efficiency of the fixed factor .The proverb 'too many cooks spoil the food aptly applies to such situation. Here, a reduction in the units of the variable factor will raise the total product.

If the factors were perfectly divisible and all of their units were homogenous (we are assuming away the possibility of specialization), neither diminishing (or negative) nor increasing returns would have occurred .We would have experienced constant returns in such cases, i.e. small plant would be as efficient as big plant .In such case, we would solve world's food problem by just increasing the number of workers on a small field.

Limitations of Law

(a) **Improvements in Technology:** The law assumes away any improvement in the technology. If this assumption is relaxed i.e. scientific or improved methods of production are adopted, the returns are bound to increase and the law will no longer hold true. However, there is some limit to the improvement in the methods of production. Hence, sooner or later, the law of diminishing returns is bound to operate.

(b) **Variable Factors working with fixed factors:** This law will not operate, if it is not possible to keep some factor fixed (say, land).

(c) **Heterogeneous variable factors:** All the units of variable factors are assumed to be homogenous or identical. In other words, diminishing marginal returns are not due to the use of inferior units of the variable factor. However, in real world various factor units are heterogeneous.

(e) **Inadequate Units of Variable Factor**: The operation of the law of diminishing returns is also held up for sometimes, if the units of variable factors i.e. labour and

capital applied to a certain fixed piece of land is insufficient to cultivate to the full capacity of that piece of land.

Importance of Law

The law of variable proportions occupies an important place in modern economic theory .It influences every aspect of economic life. This law (especially its phase of diminishing returns) has universal application in the field of production , in any form.

Law of variable proportions has vast general applicability .Thus law applies as much to industries as to agriculture .However ,in agriculture , where nature plays the major role , diminishing returns set in at an early stage than the industries , where man's role is more important .Experience of the under developed countries of the world justify the operation of this law in agriculture. Phenomenon of disguised unemployment revealing zero or near zero negative marginal productivity of labour is one such example . Withdrawal of disguised unemployed people and employing it in industrial sector can increase the output of agriculture

Agricultural production and productivity can be substantially increased by making advancement in agricultural technology through progress in science. Scientific rotation of crops, improved seeds; modern implements, better irrigation facilities, etc. are some ways in which this can be done. This will also solve the problem of food crises and starvation .Most of the developed countries of the world have been successful on this front .However , technology advancement will just postpone the operation of this law and eventually diminishing returns will set in . Thus, the application of the law of variable proportions is inevitable, inexorable and all pervading.

3.1 LAW OF RETURNS TO SCALE

The law of returns to scale is concerned with the study of production function (i.e. input-output relationship) in the long run (when all inputs are variable). Thus, long run production theory or the *law of returns to scale means that all inputs or factors are varied in the same proportion, keeping the factor proportions constant .When the quantities of all factors are changed along a particular scale, size of the firm and scale of output will change. The responsiveness of output to such changes in inputs is called returns to scale. Technology is assumed to remain constant.*

When a producer increases all the inputs in a given proportion , there are three possibilities , viz, total output may increase more than proportionately , just proportionately or less than proportionately , which occur in that order .

The law of returns to scale can be explained more precisely through the production function. Production function involving two variable inputs say capital (K) and labour (L) can be expressed as Q = f(K,L)

Where 'Q'denotes the quantity of commodity produced .Suppose both 'K'and 'L'are increased in proportion 'm' and the total output increases in proportion 'n'. The new production function is

nQ = f(mK,mL)

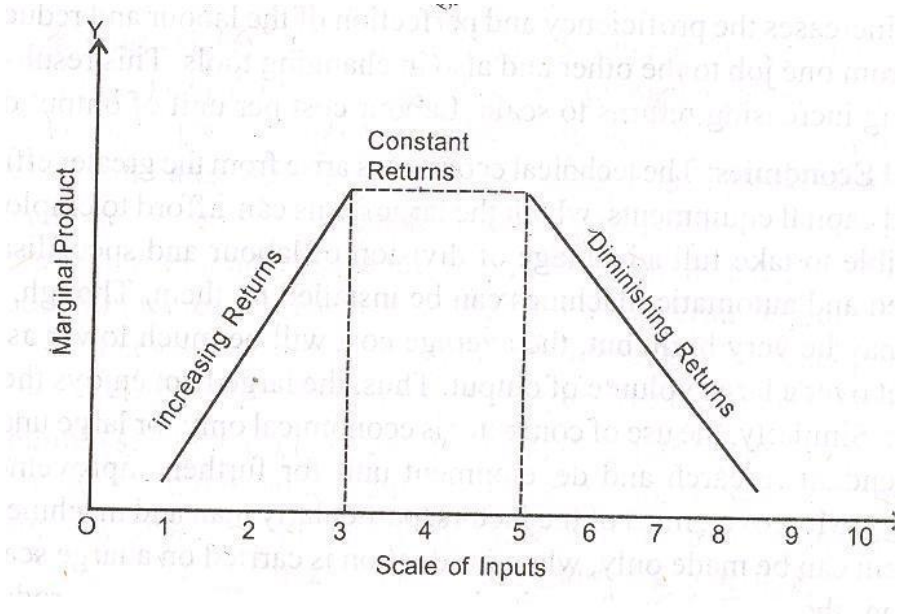
The proportion ‘n’ may be equal to greater than or less than ‘m’ Accordingly, three stages of the law of returns to scale follow:

(i) **If n=m**, i.e. , increase in the total output is proportional to the increase in inputs , it means that a situation of constant returns to scale exists .To take an example , if all inputs are doubled , then total output is also doubled .

(ii) **If n>m**, i.e., increase in the total output is greater than the proportional increase in the inputs , it means that a situation of increasing returns to scale exists .Thus, if inputs are doubled , then the total output is more than doubled .The technology used is such that the requirement of real resources per unit of output tends to decrease .

(iii) **If n<m** i.e. , increase in the total output is less than the proportional increases in inputs , it means that a situation of diminishing returns to scale exists .For example , if all inputs are doubled , then the total output is less than doubled .Here , the requirement of real resources per unit of output produced tends to increase. The three stages of the law of returns to scale are diagrammatically shown in Fig. 3.4.

Fig. 3.4



ECONOMIES OF SCALE

A business firm expands its scale of production to earn profit. It derives many economies of large scale production which, in turn, help in lowering the cost of production and increasing its productive efficiency. Such economies that occur to a firm in the course of expansion of its scale of operation by increasing all the factors or by increase in the number of firms in the industry are called economies of scale. These economies are of two types: internal economies and external economies. **Internal economies** accrue to a firm largely because of its own efforts, independently

of the actions of other firms. It begins to make better use of such resources which were not being utilized properly before the expansion of scale of production. **External economies**, on the other hand, accrue to a firm due to reasons with which an individual firm has got nothing to do. These economies are generated because of the growth of the whole industry. They are not monopolized by a single firm, but, are shared by a number of firms, when the scale of production of the industry expands.

Internal Economies

Internal economies are economic advantages, which enable a firm to get proportionately large output than increments in factor inputs, thus, causing increasing returns to scale. These economies are peculiar to each firm. They depend solely upon the size of the firm and are different for different firms. Some of the internal economies are as follows:

(a) **Specialization and Division of Labour**: As scale of production expands, higher degree of specialization and division of labour becomes possible. Under division of work, production of a commodity is spilt up into several processes. Each worker specializes in one particular process. As the worker performs the same operation again and again, the skill and dexterity of each worker is improved. Mass production methods like the assembly line in the motor car industry are available only, when the level of output is very large. They are more efficient than the best available processes for producing small levels of output. Specialization and division of labour increases the proficiency and perfection of the labour and reduces wastage of time in moving from one job to the other and also in changing tools. This results in higher productivity, causing increasing returns to scale. Labour cost per unit of output decreases as a result.

(b) **Technical Economies**: The technical economies arise from the greater efficiency of large size of plants and capital equipment's, which the large firms can afford to employ, but not small ones. It is possible to take full advantage of division of labour and specialization. Superior , more specialized and automatic machines can be installed by them. Though, fixed cost of the machinery may be very high, but, the average cost will be much lower as the total cost will be spread out over a large volume of output. Thus, the large firm enjoys the economy of superior technique. Similarly, the use of computer is economical only for large undertakings. It can have an independent research and development unit for further improvement and perfection in technology. Moreover, most of the factors, particularly man and machinery are indivisible. Full use of them can be made only, when production is carried on a large scale. At a small scale of production, they remain underutilized. Therefore, when scale of production is increased by increasing all inputs, productivity of indivisible factors increases considerably and thus results in increasing returns to scale. Further, there is mechanical advantage in using large machines and

other mechanical units. Large units are not only cheaper to operate (running cost) but also cheaper to construct (initial cost). It is called economy of increased dimensions.

(c) **Production Economies**: The large firm is able to utilize all its waste materials for the development of by-product industry. Thus, it enjoys the economy of the use of by-products. For example, the baggasse left over after manufacturing sugar from the sugarcane can be used for producing paper by installing a plant for this purpose. Further, molasses can be used to produce spirits. It can also reduce its cost by linking various processes of production. A large firm can enjoy the benefit from backward as well as forward integration of processes. The firm can avoid purchase of raw materials and other inputs from outside suppliers (for obtaining packaging materials like boxes, labels, etc) by manufacturing these inputs itself. This forward integration would reduce the dependence of the firm on outside suppliers and help the firm to produce the inputs according to its own requirements. Likewise, it can itself employ technicians for repairing the machines, reducing dependence on others. Similarly, by directly selling the product to the final consumers, the firm, on one hand, saves the expenses on intermediaries. On the other hand, it can gather correct information about the market conditions. This is a case of forward integration. Further, a firm operating at a large scale can also have reserve capacity in their plants, machinery and other equipment's. Such firm is in a better position to meet changes in demand conditions, avoid disruption of production in case of breakdown of machinery, etc. Furthermore, a large firm can maintain the inventory of spare parts to replace worn out or damaged parts of the equipment. It can also maintain adequate inventory of inputs and finished commodities to meet unanticipated rise in demand. Finally, a big firm can well afford to introduce systems like inventory control in the stores procurement division to avoid excessive procurement of raw material leading to blockage of capital. This system also avoids shortage of essential materials.

(d) **Managerial Economies**: These economies arise due to better and more elaborate management, which only the large firm can afford. In a large firm, the owner can concentrate on fundamental problems of policy-making and business expansion, delegating the routine jobs and details to highly qualified subordinates. Besides, he can also engage specialized staff and managers to look after production, accounts, sales, planning, personnel, advertisement, etc. He can, thus, secure the advantages of functional specialization. Further, managerial cost is reduced, when the scale of production increases. The extent to which managerial economies can be enjoyed depends on the efficiency of the manager. Computer network, fax machines, electronic mail services may be used for this purpose to save time, money and effort.

(e) **Marketing Economies**: As the firm expands in its size, it is able to buy raw materials at cheaper rates as it buys regularly and in bulk quantities. It can secure concessions from railways and transport companies. It also enjoys

prompt delivery, careful attention and considerate treatment from all intermediaries. It can even have its own transportation and distribution system, which avoids uncertainties. It can even have its own transportation and distribution system, which avoids uncertainties, irregularities and difficulties from raw material stage to the final finished product stage. The large firm generally has a separate marketing department manned by experts, who keep records of market trends correctly. They buy and sell on behalf of the firm in favorable market conditions. Thus, a large firm cuts down its selling cost. It has a wider choice in purchasing too. In this way, marketing economies are reaped by the big firm in its promotional activities involving selling, sales promotions, advertising, etc. and distributional activities including logistics management, dealing with order handling, storage, transportation, etc.

Large firms are also able to undertake extensive market research to identify the needs and changing preferences of the consumers so as to modify the attributes and features of the existing products or develop new products or develop new products accordingly. In house research and development department with trained research staff may be created for this purpose. This department may do in house innovations and inventions in production process and in the product itself for do in house innovations and inventions in production process and in the product itself for appreciable increases in production and sales.

(f) **Financial Economies** : The large firm with a large asset base and goodwill in the market is able secure the necessary funds either as block capital or for meeting the working capital needs of the enterprise. It can float shares or debentures and get them subscribed by the public. It can borrow from the banks and other financial institutions at relatively cheaper rates. Such opportunities are not available to small firms.

(g) **Risk and Survival Economies**: Every firm has to face general and particular risks for its existence. While former occur during general business depression due to insufficient demand, latter refer to market fluctuations for one product. Small firms cannot survive in the face of such risks and go into liquidation. Large firms, on the other hand, not only absorb such shocks (both minor and major), but also diversify their output, sources of supply, market and processes of manufacture. A large firm can withstand the risk of changing consumers' tastes and preferences.

(h) **Economies of Employee Welfare Schemes**: A large firm with adequate resources can provide employee welfare facilities for its managerial and technical staff, both within and outside the factory. Free or subsidized lunch, uniform, recreation rooms , crèches for the children of the working women, provision of housing, medical and educational facilities for employees and their families also improve the working conditions of the employees. These measures enhance the motivation, morale and commitment of the employees

to the firm and its objectives. All this raises the efficiency of the human capital and hence production.

Internal Diseconomies.

When a firm continues to expand beyond the optimum capacity, economies of scale will disappear and will give place to diseconomies. A given percentage increase in all the factors will be followed by less than a proportionate increase in the total output. Average and marginal product will diminish as a result. Thus, diseconomies are the disadvantages which a firm faces by expanding the scale of production beyond the point of optimal capacity. As these diseconomies are peculiar to a firm, they are also called internal diseconomies. Some of the diseconomies of scale are as follows.

(a) **Inefficiency of Management:** Management involves planning, organizing, controlling and coordinating a wide variety of activities like production, sales, advertisement, transportation, etc. When output exceeds the optimum level, management problems increase and managerial efficiency declines. Problem of coordination and control of various activities emerges. Further, with increase in the number of levels of managerial hirechary over loaded top management is forced to delegate responsibility and authority to lower management to avoid delay, red tapism, etc. But, the lower level officials may not have the necessary knowledge and experience to take decisions. Further more, the persons who manage the firms and who take the final decisions are far removed from the actual level of operations. They are forced to take decision on the basis of twisted, limited and distorted information (second hand information). Long chain of command often causes delay in taking decisions. Increase in the span of control makes the supervision and control over the subordinates' activities difficult. Besides, loss of personal contact between management and workers results in labour troubles. Finally, an increase in the size of the firm leads to loss of initiative, morale and motivation on the part of persons at lower levels. Thus, if all the factors are increased in a given proportion, total output does not increase by the same proportion due to increased complexities of management causing diminishing returns to scale.

(b) **Technical Diseconomies**: Every equipment has an optimum capacity at which it works most efficiently and economically. If production is increased beyond the optimum point, diseconomies arise. This will happen mainly, because, indivisible factors are being used to produce too much output. They are in less than optimum proportions with the variable factors. Further, high cost of maintenance and heavy losses in case of a breakdown or any accident may come in the way of going on for superior technology. Lack of availability of technical experts to handle the superior machines is still another restraining factor.

(c) **Financial Diseconomies**: In view of the public and control over monopolies and concentration of wealth and income, the government, banks and the financial institutions are granting various concessions to small firms. On the

other hand, number of curbs are being imposed on the large borrowers, which serve as restrain on large scale production.

(d) **Risk and Survival Diseconomies**: Top management may become reluctant to expand further by borrowing capital for fear of losing control. The commitment to make interest payments on borrowed funds acts as damper to expand by borrowing. Large firms are more exposed to the risks than the smaller ones due to the lack of liquidity. Even risks like strike, lock out, lay off are more in case of large establishments. An error in decision making by the top management may adversely affect the performance of the firm, resulting in losses.

(e) **Limited Availability of the Natural Resources**: Limited availability of natural resources also causes diminishing returns to scale. For example, doubling of coal mining plants will not double the coal output due to limited availability of coal deposits.

External Economies (and Diseconomies)

When many firms expand in a particular area, each member firm secures a number of economic advantages, which are known as external economies. These advantages are generated outside the firm. These advantages will arise, whether the industry consist of a few large firms or many small firms. All firms of the industry reap these benefits, for which firms have not to make any individual cost reduction efforts. These economies have the effect of increased production or lower costs.

External economies are shared by a number of firms or industries, when the scale of production in any industry or group of industries increases. These economies can never be monopolized by any single firm, when it expands. It depends on the individual entrepreneur, how far he is able to take advantage of these economies. To the extent he is able to make use of them; he will be able to reduce the cost of production.

In short, in the words of Stonier and Hague, "external economies are those economies in production which depend on increase in the output of the whole industry rather than on increase in the output of the individual firm. External economies occur where in increase in the size of an industry leads to lower costs for each individual firm comprising the industry.

Some of the **examples** of external economies are:

(i) The availability of better transportation and communication facilities at cheaper rates with the expansion in the volume of traffic (freight).

(ii) When in an area, a number of firms producing the same commodity are set up; a number of other firms will be established to make adequate and certain supply of raw materials, accessories and parts of earlier group of firms at reasonable prices.

(iii) Opening of new network of transportation, communication, banking system, insurance companies, warehouses and other commercial services.

(iv) Development of specialized marketing agencies and facilities of joint publicity.

(v) Provision of better and more adequate sources of power, water and electricity.

(vi) Establishment of technical and engineering institutions ensuring continuous supply of skilled manpower.

(vii) Better housing, public health and recreational facilities.

(viii) Growth and development of ancillary industries, making use of waste matter by giving it the shape of by-products.

(ix) Availability of technical personnel and skilled workers.

(x) Setting up of government agencies to facilitate permits, licenses and other clearances.

(xi) Interacting with other concerns in research and development by pooling manpower and financial resources and protecting the mutual interests of all to improve the production process and reduce cost of production.

(xii) Appearance of trade journals simulates inventions and improvements in technical knowledge through supply of information as to availability of new source of raw materials, export and import potentialities, and change in government's policy affecting the industry as a whole. This information provides competitive edge to all the firms vis-à-vis foreign competitors.

External economies arise mainly due to *localization of industries and specialization.* Localization of industry means concentration of a number of firms producing the similar products at a place. This may be due to natural advantages or acquired advantages that the place has for the production of a particular commodity. Further, concentration of firms in an area induces the emergence of firms supplying the specialized services such as advertising agencies, legal consultation, accountancy, distribution, etc. Provision of these common services leads to reduction in costs.

External economies operate up to the point of optimum capacity. Beyond this point economies give place to diseconomies. The same forces which were working to the advantage of the firms start working against them. Some of the **external diseconomies** are:

(j) Intense competition among the firms raises the price of the raw materials and the factors of production.

(ii) Concentration of firms in an area puts heavy pressure on the transport system causing frequent traffic jams and severe bottlenecks. Accordingly, delays take place in transporting raw materials and finished products.

(iii) The congesting in an area necessitates heavy expenditure on housing worker's welfare, amenities and pollution control.

(iv) Scarcity of fuel, electricity, water, power, finance and technical labour raises the price.

(v) Management and coordination becomes difficult.

(vi) Pressure on banks and financial institutions causes financial problems for the firms.

(vii) Exhaustibility of non-renewable natural resources like coal raises the cost of production.

Both internal and external economies arise with the expansion of the scale of production. But, the distinction between internal and external economies is to be noted. While the former are particular to an individual firm, the latter are shared by all the firms in an industry together. Thus, internal economies depend upon the size of individual firms, while external economies depend on the growth of an industry in a particular area.

Distinction between internal and external economies is not water light. There can be instances in which external economies enjoyed by the firms may become internal economies to some other firms or industry. For example, the development of electricity in a region will confer external economies to all the firms in the industry using electricity, while improvements introduced by individual firms will be of the nature of internal economies. Similarly, expansion in production capacity of steel industry will bring internal economies to the steel producers. Consequently, availability of cheaper steel to other firms, using steel as raw material, shall imply reductions in their cost of production. These reductions in costs are in the form of external economies. Robertson visualizes such situation as *internal- external economies*. In brief, internal and external economies are closely related and are interdependent on each other.

RETURNS TO A FACTOR VS. RETURNS TO A SCALE

Returns to a factor and returns to a scale are the two important laws of production. Both of these laws examine the inputs-output relationship. Increasing, constant and diminishing returns are the three phases of both the laws. However, there is one basic difference between the two laws. In return to a (variable) factor (or the law of variable proportions), only one factor is changed, while keeping all other factors constant. On the other hand, in returns to scale, all the factors are changed. Some of the differences between the two laws are:

Returns to a factor	Returns to a Scale
1. One factor is varied, while all other factors are kept constant such that factor proportions are altered. 2. Applicable during short period. 3. Law does not apply, where the factors must be used in fixed proportions to yield a product. 4. Increasing returns are due to indivisibility of factors and specialization of labour, while diminishing returns are due to non-optimal factor proportion and imperfect elasticity of substitution of factors.	1. All the factors are varied, such that factor proportions remain unaltered. 2. Applicable during the long period as all factors can be varied in such period. 3. Law does apply, where the factors must be used in fixed proportions to yield a product. 4. Increasing returns to scale are due to economics scale, while diminishing returns to scale are due to diseconomies of scale (internal as well as external.)

Despite these differences, both these laws assume (i) constant technology, (ii) homogenous factors units, (iii) output in physical units, and (iv) stable factor prices. Further, in both the laws, the behaviour of output is studied in three phases, stage of increasing returns, stage of diminishing returns and stage of negative returns under the law of variable proportions while increasing returns to scale, constant returns to scale and diminishing returns to scale under the law of returns to scale. Both these laws study the behaviour of output under a set of conditions.

3.2 TYPES OF BUSINESS ORGANISATION

INTRODUCTION

Business is the activity with the object of earning an income through profit. As you know, business activities can be production and sale of goods & services or purchase & sale of goods & services. Now you can group these activities into:
Commerce, Industry and Service.

- Commerce involves the activities in the movement of goods and services from the producer to the consumer. It includes procurement, grading, storing, transporting commodities through the wholesalers, retailers etc.
- Industrial activities involve manufacture or some definite treatment of materials from which marketable commodities can be manufactured.
- 'Services' involve intangibles. It can be professional services like in case of doctors, lawyers etc. or it can be other services like transport etc.

MEANING OF BUSINESS ORGANISATION

Literally speaking, business means "State of being busy" throughout. In economic sense, the word business means work efforts and acts of people which are connected with the production of wealth. Functionally, "those human activities which involve production or purchase of goods with the object of selling them at a profit." are called business.

The word organisation has originated from the word 'organism' which means any system with parts dependent upon each other. In a human body, it is the brain which controls, directs and co-ordinates the activities of different parts of the body. The human body is a combination of various limbs. If any one of the limbs stops functioning properly, then some defects will develop in the body. If the goals of an enterprise are to be achieved, the activities of the different departments must be welded together. Organisation does this co-ordination. It establishes inter-relations between departments.

Sound organisation is essential for the success of a business. The reason is that it makes administration easy. It consists of determining the activities to be undertaken for achieving the objectives. The activities are arranged in groups. Each group of activities are entrusted to each department. The duties and functions of each individual in each department are defined. So organization consists of department and grouping of activities, delegation of work and establishment of relationship between various persons.

Organisation pervades all the important phases of human life. A man is born in organisation (hospitals and clinics). He is educated in an organisation (Schools, Colleges and universities). He works in an organisation (office, factories and business).

The term business organisation is very often used in different senses. Firstly, it is used to represent a business enterprise such as Tata Iron & Steel. Secondly, business organisation is a subject of study consisting of topics concerned with organisation and management of industrial and commercial organisation. Thirdly, the term organisation is used to mean bringing together various elements of business with the object of establishing harmonious relationship and adjustment in their functioning.

A business organisation can be classified in two types, viz,. Individualistic institutions and Government institutions. The following section discuss about the same:

3.1 TYPES OF BUSINESS ORGANISATION

A. INDIVIDUALISTIC INSTITUTIONS

1. Sole Trader
2. Joint Hindu Family
3. Partnership
4. Joint Stock company
5. Co-operatives
6. Multinational companies
7. Non-profit organizations

B. GOVERNMENT

1. Departmental Undertaking
2. Public Corporation
3. Government Company
4. Board organization

A. INDIVIDUALISTIC INSTITUTIONS

Individualistic institutions are established by a single individual or by a number of individuals. The following are the different forms of business organisation.

1. Sole Trading Institutions

Any business unit which is owned and controlled by a single individual is known as a sole trading concern. The person who manages it, is called a sole trader. It is also named sole proprietorship business or single entrepreneurship or individual proprietorship. It is stated to be the oldest of all the forms of business enterprises. He may use his own savings for carrying on the business. He may borrow from his friends, relatives and others. He himself manages the business with assistance from relatives or employees. The sole trader makes all purchases and sells on his own and maintains all the account. He alone enjoys all profits and bears all

losses in business. He is the founder as well as the controller of the business. The sole trading concern is run on the principle "All is he and he is all in all". It is easy to set up and manage the sole proprietor's business. No legal formalities are required.

Advantages

1. Easy formation with formal license only
2. Freedom available to the sole proprietor to take action enables quick decisions and prompt action. There is no need to consult anyone.
3. Personal contacts with customers & employees
4. Business secrecy can be maintained and hereditary business is enabled
5. There is direct relationship between the economical & efficient effort and rewards. Hence costs are also controlled effectively.
6. Since the business is conducted alone or with a tight family structure, there is no necessity for formal organizational structure and hence absolute flexibility is there.
7. Business Tax procedures are relatively simple with all income from business getting reported in the owner's individual tax return. The owner can take maximum benefits of tax concessions given for individuals

Disadvantages

1. The capital structure (capital and borrowings) of the business is limited to personal wealth and credit standing of the proprietor.
2. Limited managerial and technical skills
3. The owner is responsible for all the debts and the liability is unlimited dipping into personal assets like house property, vehicles, furniture, appliances etc.
4. Since the business is dependent upon the health & wealth and life of the owner, there is no continuity. This form of business is suitable where personal skills & contacts are important.

2. Joint Hindu Family

India is unique in the system of Joint Hindu Families. A Joint Hindu Family comprises of father, mother, sons, daughters, grandsons and granddaughters. They hold the property jointly. They do the business under the control of the head of the family. These families have been engaged in occupations like agriculture ,handicrafts, small industries etc. These business units are known as Joint Hindu family business. This system is found only in India.
The system of Joint Hindu family came into existence by the operation of Hindu law. There will not be any agreement among members. The firm is owned by the members of the family who have inherited their ancestral property. Their membership is conferred upon the members by virtue of their birth in the family. The head of the family is known as 'KARTA'. The members are called coparceners. It is regulated by the provisions of Hindu Law. According to Hindu Law, a Hindu can inherit the property from three generations. In other words, a son, a grand son, a great grand son become joint owners for the property by birth in

the family. The law provides rights to women for their living and marriages in the joint family.

3. Partnership

A sole trading concern has certain limitations. It cannot be expanded beyond a certain stage. Where large capital, and skill are necessary, a single individual cannot provide both. Two or more persons may join together and provide necessary capital and skills. Then partnership comes in to existence

According to Prof. Haney, *"*Partnership is the relation existing between persons competent to make contracts who agree to carry on a lawful business in common with a view to private gain".

The partnership is formed as a result of an agreement between two or more persons. **The minimum number is two and the maximum number is 10 in banking and 20 in the case of nonbanking business.** Partnership should not carry on any unlawful or illegal business. Partners may share profit or loss in an agreed proportion. If there is no agreement, partners share profit or loss equally. Every partner has a right to take part in the management of the business.

He has right to give his opinion. The partners are jointly and severally liable for the debts of the firm. Persons who enter into partnership with one another are called partners. They are collectively called as a firm.

Advantages

1. Increased Capital Raising Power and Managerial & Technical expertise compared to sole proprietorship.
2. Easy formation compared to joint stock companies & easy dissolution as agreed by all the partners or 14 days' notice to other partners in case of partnership at will.
3. Business Secrecy can be maintained since there is no requirement by law for publication of final accounts

Disadvantages

1. Partnership has a less capital raising power and Managerial or Technical expertise as compared to joint stock companies.
2. Unlimited liability renders the partnership unsuitable to take up large scale operations.
3. Absence of separate legal status for the business and continuity
4. The partnership is not transferable unless all the partners agree for the same

In Europe and America, there is a system of Limited Partnership wherein two types of partners – General and Limited / Special Partners - will be there. The liability of the Limited /

Special Partners are limited to the extent of their investment only whereas the liability of General partners is unlimited whose personal assets are also liable for the actions of the business.

4. Joint Stock Company / A Company

You must have heard about Reliance Industries Limited (RIL), Tata Iron and Steel Company Limited (TISCO), Steel Authority of India Limited (SAIL), etc. Have you ever thought who owns them? What is the volume of financial transactions of these companies? If you think about it, you will find that these organisations are quite large in size and their activities are spread all over the country. Thus, it is not possible for these organisations to be formed as sole proprietorship or partnership form of business. Then, how are they formed and managed? Actually, they are a different form of business organisation and require much more capital and manpower than sole proprietorship and partnership form of business organisation.

A company is an association of many persons. The capital of the company is divided into small units called a share. Anyone who holds or buys a share in a company is called a shareholder. Shareholders are the members of the company. A company is called a joint stock company as the capital is contributed by a large number of investors. A joint stock company may be a public company a private company.

A company is defined as, *"*an incorporated association which is an artificial person created by law having a common seal and perpetual succession*".*

A company is considered as a person by law. It can enter into contract in its own name. It must have a common seal as it cannot sign documents. A company has continuous perpetual existence. The liability of a share holder is limited. Shares can be freely transferred from one person to another. It encourages the people to save even small amount. A company is an artificial person. It acquires legal entity through incorporation. Incorporation implies registration of the company with the Registrar as a body corporate. Whether it is a private company or a public company, it should be incorporated with the Registrar of companies as per the Companies Act of 1956. The management of Joint Stock Company is entrusted to the board of directors.

Characteristics of Joint Stock Company

You are now familiar with the concept of company as a form of business organisation. Let us now study its characteristics.

i. Legal formation

No single individual or a group of individuals can start a business and call it a joint stock company. A joint stock company comes into existence only when it has been registered after completion of all formalities required by the Indian Companies Act, 1956.

ii. Artificial person

Just like an individual, who takes birth, grows, enters into relationships and dies, a joint stock company takes birth, grows, enters into relationships and dies. However, it is called an artificial person as its birth, existence and death are regulated by law and it does not possess physical attributes like that of a normal person.

iii. Separate legal entity

Being an artificial person, a joint stock company has its own separate existence independent of its members. It means that a joint stock company can own property, enter into contracts and conduct any lawful business in its own name. It can sue and can be sued by others in the court of law. The shareholders are not the owners of the property owned by the company. Also, the shareholders cannot be held responsible for the acts of the company

iv. Common seal

A joint stock company has a seal, which is used while dealing with others or entering into contracts with outsiders. It is called a common seal as it can be used by any officer at any level of the organisation working on behalf of the company. Any document, on which the company's seal is put and is duly signed by any official of the company, become binding on the company. For example, a purchase manager may enter into a contract for buying raw materials from a supplier. Once the contract paper is sealed and signed by the purchase manager, it becomes valid. The purchase manager may leave the company thereafter or may be removed from the job or may have taken a wrong decision, yet for all purposes the contract is valid till a new contract is made or the existing contract expires.

v. Perpetual existence

A joint stock company continues to exist as long as it fulfils the requirements of law. It is not affected by the death, lunacy, insolvency or retirement of any of its members. For example, in case of a private limited company having four members, if all of them die in an accident the company will not be closed. It will continue to exist. The shares of the company will be transferred to the legal heirs of the deceased members.

vi. Limited liability

In a joint stock company, the liability of a member is limited to the extent of the value of

shares held by him. While repaying debts, for example, if a person owns 1000 shares of Rs. 10 each, then he is liable only upto Rs 10,000 towards payment of debts. That is, even if there is liquidation of the company, the personal property of the shareholder cannot be attached and he will lose only his shares worth Rs. 10,000.

vii. Democratic management

Joint stock companies have democratic management and control. That is, even though the shareholders are owners of the company, all of them cannot participate in the management of the company. Normally, the shareholders elect representatives from among themselves known as 'Directors' to manage the affairs of the company.

Advantages of Joint Stock Company

You must be keen to know why we should form a company for carrying out business? Obviously, this is because there are many advantages which the company form of business organisation enjoys over other forms of business organisation. Let us read about those advantages.

The main advantages of Joint Stock Company are

(i) Large financial resources: A joint stock company is able to collect a large amount of capital through small contributions from a large number of people. In public limited company shares can be offered to the general public to raise capital. They can also accept deposits from the public and issue debentures to raise funds.

(ii) Limited Liability: In case of a company, the liability of its members is limited to the extent of the value of shares held by them. Private property of members cannot be attached for debts of the company. This advantage attracts many people to invest their savings in the company and it encourages the owners to take more risk.

(iii) Professional management: Management of a company is vested in the hands of directors, who are elected democratically by the members or shareholders. These directors as a group known as Board of Directors (or simply Board) manage the affairs of the company and are accountable to all the members. So members elect capable persons having sound financial, legal and business knowledge to the board so that they can manage the company efficiently.

(iv) Large-scale production: Due to the availability of large financial resources and technical expertise it is possible for the companies to have large-scale production. It enables the company to produce more efficiently and at lower cost.

(v) Contribution to society: A joint stock company offers employment to a large number of people. It facilitates promotion of various ancillary industries, trade and auxiliaries to trade. Sometimes it also donates money towards education, health and community services.

(vi) Research and Development: Only in company form of business it is possible to invest a lot of money on research and development for improved processes of production, new design, better quality products, etc. It also takes care of training and development of its employees.

Limitations of Joint Stock Company

In spite of many advantages of the company form of business organisation, it also suffers from some limitations. Let us note the limitations of Joint Stock Companies.

(i) Difficult to form: The formation or registration of joint stock company involves a complicated procedure. A number of legal documents and formalities have to be completed before a company can start its business. It requires the services of specialists such as Chartered Accountants, Company Secretaries, etc. Therefore, cost of formation of a company is very high.

(ii) Excessive government control: Joint stock companies are regulated by government through Companies Act and other economic legislations. Particularly, public limited companies are required to adhere to various legal formalities as provided in the Companies Act and other legislations. Non-compliance with these invites heavy penalty. This affects the smooth functioning of the companies.

(iii) Delay in policy decisions: Generally policy decisions are taken at the Board meetings of the company. Further the company has to fulfill certain procedural formalities. These procedures are time consuming and therefore, may delay action on the decisions.

(iv) Concentration of economic power and wealth in few hands: A joint stock company is a large-scale business organisation having huge resources. This gives a lot of economic and other power to the persons who manage the company. Any misuse of such power creates unhealthy conditions in the society, e.g., having monopoly over a particular business or industry or product; exploitation of workers, consumers and investors.

Suitability of Joint Stock Company

A joint stock company form of business organisation is found to be suitable where the volume of business is large and huge financial resources are needed. Since members of a joint stock company have limited liability it is possible to raise capital from the public without much difficulty. This form of organisation is also suitable for businesses which involve heavy risks. Again, for business activities which require public support and confidence, joint stock form is preferred as it has a separate legal status. Certain types of

businesses, like production of pharmaceuticals, machine manufacturing, information technology, iron and steel, aluminum, fertilisers, cement, etc., are generally organised in the form of joint stock company.

4.1 Types of Companies

A company can be either a private or a public company. These two types of companies are discussed in detail in the following paragraphs.

4.1.1 Private Ltd. Company

A private company means a company which:
(a) restricts the right of members to transfer its shares;
(b) has a minimum of 2 and a maximum of 50 members, excluding the present and past employees;
(c) does not invite public to subscribe to its share capital; and
(d) must have a minimum paid up capital[1] of Rs.1 lakh or such higher amount which may be prescribed from time-to-time.

It is necessary for a private company to use the word private limited after its name. If a private company contravenes any of the aforesaid provisions, it ceases to be a private company and loses all the exemptions and privileges to which it is entitled.

4.1.2 Public Ltd. Company

A public company means a company which is not a private company. As per the Indian Companies Act, a public company is one which:
(a) has a minimum paid-up capital of Rs. 5 lakhs or a higher amount which may be prescribed from time-to-time;
(b) has a minimum of 7 members and no limit on maximum members;
(c) has no restriction on transfer of shares; and
(d) is not prohibited from inviting the public to subscribe to its share capital or public deposits.

A private company which is a subsidiary of a public company is also treated as a public company.

5. Co-Operative Society

A co-operative society is a voluntary association of persons. Persons hailing from the same locality voluntarily join together to achieve a common economic objective. Any person can join the society. There is no compulsion to become a member of a society. A person can join a co-operative society whenever he likes and leave it whenever he wishes. In a co-operative society all the members are equal. Every member has only one vote irrespective of the number of shares held by him. "One man one vote" is the most important principle. The

[1] Paid up Capital means the amount of money contributed via Equity (shareholders).

society is managed on democratic principles. Every member has equal voice in the management of a society to render service to its members. Service is primary and profit is secondary.

The business of a co-operative society is generally carried on cash basis. Every state government has appointed a registrar of co-operative societies for registering, controlling and supervising the societies. When a co-operative society is registered, it becomes a body corporate. It has separate legal existence. It is exempted from payment of stamp duty and registration fees. It also enjoys the special feature of limited liability.

6. Multinational Companies (MNC's)

The term "multinational" consists of two different words, 'multi' and 'national.' The prefix 'multi' means 'many', while the word 'national' refers to nations or countries. Therefore, a multinational company may be defined as a company that operates in several countries. Such a company has factories, branches and in more than one country.

According to the United Nations Commission on Multinational Corporations, a multinational corporation is a corporation which operates, in addition to the country in which it is incorporated, in one or more other countries.

A multinational corporation is also known as a transnational corporation, namely, 'Global giant', or 'World enterprise' or 'international enterprise'. All forms of business organisation that transcend political frontiers may be called as multinational firms.

In simple words, a multinational company is a company carrying on business in two or more countries.

According to Neil H.Jocoby, "A multinational corporation owns and manages business in two or more countries"

FEATURES

1. A multinational company is operated in more than one country simultaneously.
2. It is generally very large in size.
3. Its purpose is to reduce transport costs and to make use of raw materials, labour, capital and market of foreign countries.

There are 500 to 700 MNCs operating in the world today, half of them are U.S multinationals and the rest are based outside United States. The multinationals based in the USA have the largest share of foreign direct investment, followed by the U.K, Germany, Japan, Switzerland, France and Canada. In underdeveloped countries the investment and employment created by the MNCs have been chiefly concentrated in about a dozen nations,

namely, Brazil, Mexico, Hong Kong, Philippines, Singapore and South Korea. According to the study of International Labour Organisation (ILO) Latin America accounts for about 60% of the MNC employment in developing countries, followed by Asia 30% and Africa 10%. Foreign investment has moved to a limited number of developing countries which offer political stability and a convenient economic environment, including tax incentives, large markets, cheap labour and easy access to oil and other natural resources.

Examples

A few examples of multinational companies are given below:

1. Hindustan Unilever Limited
It is a British company that has subsidiaries and branches in several countries. It established a subsidiary company called Hindustan Unilever Limited in India.
2. International Business Machine (IBM)
It is an American company having branches in several countries.
3. Philips
It is a Dutch Company having a subsidiary company called Philips India.
4. Coca Cola Corporation
It is an American company manufacturing and selling soft drinks in several countries.

7. Non-Profit Organizations

Non-profit organisation can be classified into public Sector organisations and private sector organisations. Some organisations created by the Government in the public sector are directed towards meeting the basic needs of the people. Many private sector organisation are created by socially oriented people with a view to meet certain unmet needs of the society. In both these cases profit-making is not a goal.

It is possible to classify non-profit organisation into public utilities and social service organisations. Water supply, postal services, general hospitals, etc., are examples of public utilities. On the other hand, organisations of voluntary social workers, also known as NGOs (non-governmental organisations) working in the fields like rehabilitation of disabled persons, pensioners' homes, adult education, non-formal education, schools for the blind or the deaf, HIV / AIDS awareness etc., are examples of this type. The following chart illustrates this classification

Public sector non-profit organisation can take various forms like departmental establishments, autonomous boards/corporations etc. Their organisational patterns, merits and demerits are as discussed earlier under public sector undertakings. Some characteristics, however, are worth noting.

(i) Most of these organisations enjoy a certain degree of autonomy to make room for flexibility and quick decisions;

(ii) Such organisations have a provision for advisory boards or committees which can provide broad guidelines for the functioning of the organisation as well as for the purpose of a general monitoring;
(iii) Normally local or regional branches / boards have the freedom to adjust their activities to the local needs of the society;
(iv) The beneficiaries or the users can send their suggestions / complaints for improving the performance of these organisations;
(v) Annual accounts are audited and placed before the concerned house like the municipal corporation, legislative assembly or the parliament.

Private sector organisations usually prepare their own constitution and get the organisation registered under the Public Trust Acts as well as / or Societies Act. The members constituting such charitable social service organisation constitute what is known as the General Body which meets once a year to review the report and to accept the accounts. The day-to-day functioning is taken care of by the Executive Committee or the Management Council or some such committee under any other name like the business council supervisory board etc.

Whatever the type of non-profit organisation, a common characteristic is that it serves. some vital felt need of the people which either cannot be meet through the market mechanism or, if left to market mechanism, users are likely to be exploited or go unserved. The pricing policy of such organisations depends upon whether the organisation is aided or funded by some other philanthropic organisation. At times the services are rendered free of charge and the costs are entirely meet by the funding agencies or the government, as the case may be. Sometimes the prices are subsidized for keeping them low and within the reach of the low income beneficiaries. Sometimes prices/fees are discriminatory being linked to the annual income of the users. In some cases, the prices just cover the costs.

In modern times, and especially in more developed countries, voluntary agencies are being entrusted with tasks which earlier were performed by the government. This arrangement of voluntarism has various advantages. Such voluntary organisations –

(i) can provide quality service for they are run by committed social workers;
(ii) can ensure people's participation due to their service motive,
(iii) can be flexible in procedure and approach and this suits the people,
(iv) are close to the people and therefore, can remain in touch with the users and can monitor the way in which needs of the people are met,
(v) can take a feed-back and re-adjust their methods / procedures to instill more efficiency or better quality in service

Choice of form of organisation:
Selection of an appropriate form of organisation can be made after taking various factors into consideration. Initial costs, liability, continuity, capital considerations, managerial ability, degree of control and nature of business are the key factors that need to taken into account while deciding about the suitable form of organisation for one's business.

B. GOVERNMENT INSTITUTIONS

In the present age, in order to expedite the economic progress of the country the government also establishes and conducts business. Public sector enterprises are those enterprises which are owned, controlled and operated by the central or state government or by both. Such enterprises are run mainly to provide service to the public. The performance of public enterprises is discussed in the parliament. These enterprises are generally established as semiautonomous or autonomous bodies. They are engaged in industrial and commercial activities.

In India, the central and state governments have established several public enterprises. These enterprises produce a wide variety of goods such as iron and steel electronics, ships, aircrafts, locomotives, heavy machinery, fertilisers, chemicals, insecticides, drugs and consumer products. Many of the public enterprises are very large in size employing thousands of workers and having investment of several hundred crores of rupees.

1. Departmental Undertaking

This is considered as a department attached to the ministry of a government. Its administration is in the hands of the chief administrative officer of the ministry. Here the department is a part of the government. This is the oldest form of organisation of state enterprise. It may be run either by central government or by the state government. Railways, postal, B.S.N.L., broad casters like Doordarshan are the examples of Departmental Undertakings.

2. Public Corporation

This is established under a specific statute passed in the parliament. It is known as a statutory corporation because it is created by a statute. The statute defines its objectives, powers and functions. It is an autonomous body fully financed by the government. It has a separate legal existence independent of the government. The corporation is wholly owned by the government. Its entire share capital is contributed by the state. Its management is vested with a Board of Directors appointed or nominated by the government. There is no government interference in the day to day working of the corporation. The main objective of the corporation is to serve the public. A statutory corporation has its own staff. Its employees are not government servants. It is fully accountable to the parliament or state legislature. **Reserve Bank of India, Air India, IDBI, Life Insurance Corporation and Unit Trust of India are the examples of public corporation.**

3. Government Company

Government Company is also established under the Companies Act of 1956. It is a company in which not less than 51% of paid up share capital is held by the central government or by one or more state governments or jointly by the central and state governments. In India, the government companies also subscribe share capital of the private company and so sometimes it is known as mixed ownership company. It is a body corporate independent of the

government. It is managed by a Board of Directors nominated, by the government and other shareholders. Its employees are not government servants.

It enjoys borrowing powers. It is accountable to the ministry or department concerned. **Hindustan Steel Limited, Bharat Heavy Electricals Limited, ONGC, SAIL are the examples of Government Company.**

3.1 Holding company and subsidiary company

If company A holds more than 50% Shares of company B then, Company A is a holding company and Company B is a subsidiary company.

Example: Coal India is a holding company. Bharat Coking ltd, Mahanadi Coal Fields ltd are its subsidiary companies.

Similarly, Konkan Railway is a subsidiary company of Indian Railways. Although Indian Railways is not a 'Holding Company', it is a Departmental undertaking.

4. Board Organisation

In this organisation management is carried on by a government nominated independent Board. It has its own rules and regulations. **Tamil Nadu Electricity Board, Tamil Nadu Housing Board, Tamil Nadu Water and Drainage Board are the examples of Board Organisation.**