PRODUCTION

What is Production?

Production is the process of making or manufacturing goods and products from raw materials or components. In other words, production takes inputs and uses them to create an output which is fit for consumption – a good or product which has value to an end-user or customer.

Production in Economics is a very important economic activity. As we are aware, the survival of any firm in a competitive market depends upon its ability to produce goods and services at a competitive cost.
One of the principal concerns of business managers is the achievement of optimum efficiency in production by minimising the cost of production.

Definition of Production:

According to Bates and Parkinson:

"Production is the organised activity of transforming resources into finished products in the form of goods and services; the objective of production is to satisfy the demand for such transformed resources".

According to J. R. Hicks:

"Production is any activity directed to the satisfaction of other peoples' wants through exchange". This definition makes it clear that, in economics, we do not treat the mere making of things as production. What is made must be designed to satisfy wants.

What Does Production Mean?

In Economics, Production is a process of transforming tangible and intangible inputs into goods or services.
Raw materials, land, labour and capital are the tangible inputs, whereas ideas, information and knowledge are the intangible inputs. These inputs are also known as factors of production.

So Production is the process of making products from raw materials, but production also has economic value because it is creating an output which has a value and will satisfy human wants and needs.

Put simply, production creates products which humans want and are willing to pay for, which boosts the economy and allows manufacturers to continue producing more and more outputs.

In economics, a business which produces goods are known as “producers” and these companies are taking the inputs available to them (both material and immaterial) to produce products which the consumer will want to buy.

Inputs don’t have to be raw materials either. An input can also be immaterial or intangible, for example, manufacturing plans or technical and industry know-how.

It’s becoming common for the manufacturing processes associated with production to be outsourced by companies as a way to reduce their costs. In these companies, they pay a third-party company a fee to take on the production of the products and can instead focus on the design, marketing, and selling of the product.
An example of this would include a clothing company who outsources to an online production company and then focuses on distributing their product rather than taking on the manufacturing of the clothes.

Concept of Production

Production in Economics can be defined as the process of converting the inputs into outputs. Inputs include land, labour and capital, whereas output includes finished goods and services.
In other words, Production in Economics is an act of creating value that satisfies the wants of the individuals.
Organisations engage in production for earning maximum profit, which is the difference between the cost and revenue. Therefore, their production decisions depend on the cost and revenue. The main aim of production is to produce maximum output with given inputs.

Importance of Production

Production in Economics is considered very important by organizations.

Importance of Production are as follow:

- Helps in creating value by applying labour on land and capital
- Improves welfare as more commodities mean more utility
- Generates employment and income, which develops the economy.
- Helps in understanding the relation between cost and output

Production Examples

Outsourced Production

Apple is a good example of immaterial input production because they take great care in brainstorming new ideas and designs for their products (mostly based out of California).

They hire the best designs and creative minds in the world to create the blueprints for their products, but the actual production of the physical devices is outsourced to huge electronics manufacturing companies in China.

Let's say you run a small t-shirt company out of your bedroom. In order to produce your product to sell to customers, you would need to invest in an expensive printing machine.

If that machine costs $1,000 to purchase and you sell your t-shirts for $20 each, you would need to sell 50 shirts before you break even on the cost of the machine (and this doesn't factor in the cost for ink).

Alternatively, you could outsource the production of these t-shirts to a local or online printer who already have a machine. They might charge you $5 per shirt created, and if you sold 50 shirts, you'd have $750 profit.

Batch Production

Jess's Bakery sells blueberry muffins. Since they only have one product, it makes sense for them to produce these in batches of 100 at a time.

Batch producing the muffins makes it cheaper for Jess to produce, and allows her to make more profit from selling them.

Mass Production

Toyota make a lot of cars each year, and all of those cars need seats. Mass production allows them to produce the car seats in a continuous way by using a "production line".

The seat moves down the line to various stations where workers will produce the seat. This can include adding the upholstery, installing the seatbelts, testing the seatbelts, fitting the headrests and so on.

Household Product

This type of production is for goods and services that are consumed by members of a household. For example, a mother who bakes bread in the morning to make sandwiches for the kids.

There are many examples of production across different sectors where something of value is being created for consumers.

Product Economics

As mentioned previously, production and the level to which the goods satisfy the consumer's needs is a good measure of economic well-being.

The improving price to quality ratio and an increase in income from a growing and efficient production market helps to increase the GDP

When the quality to price ratio of the product increases, it also improves the competitiveness of the product because other manufacturers will have to increase their quality to price ratio as well.

Often this means that products have to lower the price and take a loss in profit, but the increases competitiveness in the market leads to a growth in sales volume, which ultimately increases the well-being of the economy.

The specific area of economics which focuses on production is called production theory, and this is used by economics to explain the principles by which a business decides how much of it's commodity (or outputs/products) it will produce.

What is not Production?

The making or doing of things which are not wanted or are made just for the fun of it does not qualify as production. On the other hand, all jobs which do aim at satisfying wants are part of production.

Those who provide services Such as hair-dressers, solicitors, bus drivers, postmen, and clerks are as much a part of the process of satisfying wants as are farmers, miners, factory workers and bakers. The test of whether or not any activity is productive is whether or not anyone will buy its end-product. If we will buy something we must want it; if we are not willing to buy it then, in economic terms, we do not want it.

Importance of Exchange:

So from our above definition it is clear that many valuable activities such as the work done by people in their own houses and gardens (the so-called do it yourself exercise) and all voluntary work (such as free coaching, free-nursing, collection of subscription for a social cause such as flood-relief or earthquake- relief) immensely add to the quality of life but there is no practical way of measuring their economic worth (value).

This being so, and because in economics an important task is to measure changes in the volume of production, it is necessary to add the qualifying clause 'through exchange', i.e., in return for money, to the definition of production.

Three Types of Production:

For general purposes, it is necessary to classify production into three main groups:

1. Primary Production:

Primary production is carried out by 'extractive' industries like agriculture, forestry, fishing, mining and oil extraction. These industries are engaged in such activities as extracting the gifts of Nature from the earth's surface, from beneath the earth's surface and from the oceans.

2. Secondary Production:

This includes production in manufacturing industry, viz., turning out semi-finished and finished goods from raw materials and intermediate goods— conversion of flour into bread or iron ore into finished steel. They are generally described as manufacturing and construction industries, such as the manufacture of cars, furnishing, clothing and chemicals, as also engineering and building.

3. Tertiary Production:

Industries in the tertiary sector produce all those services which enable the finished goods to be put in the hands of consumers. In fact, these services are supplied to the firms in all types of industry and directly to consumers. Examples cover distributive traders, banking, insurance, transport and communications. Government services, such as law, administration, education, health and defence, are also included.

Output:

Any activity connected with money earning and money-spending is called an economic activity. Production is an important economic activity. It results in the output (creation) of an enormous variety of economic goods and services.

Factors of Production:

Production of a commodity or service requires the use of certain resources or factors of production. Since most of the resources necessary to carry on production are scarce relative to demand for them they are called economic resources.

Resources, which we shall call factors of production, are combined in various ways, by firms or enterprises, to produce an annual flow of goods and services.

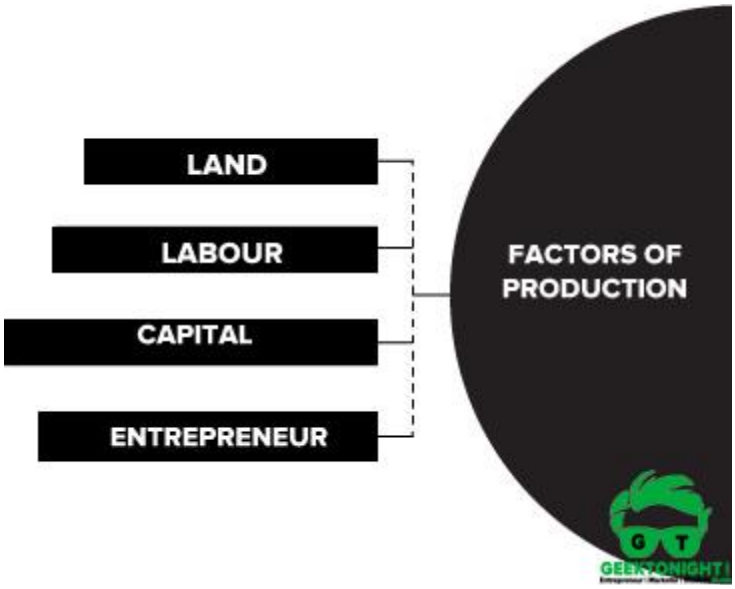


Table 5.1: A Classification of Factors of Production:

Name	Nature	Reward
Land	Any natural resources	Rent
Labour	Toil and/or skills	Wage
Capital	Man-made resource	Interest
Enterprise	Risk taking and organising	Profit

Each factor gets a reward on the basis of its contribution to the production process, as shown in the table.

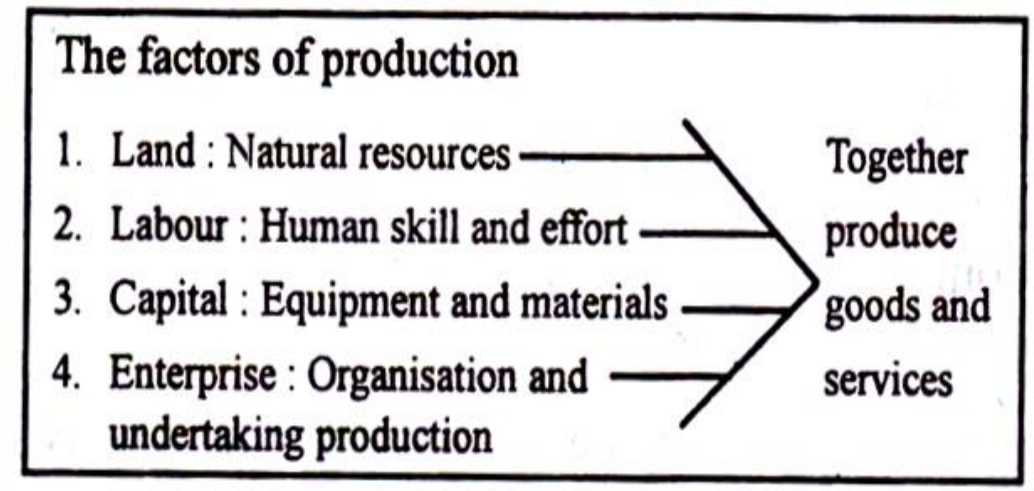
In fact, the resources of any community, referred to as its factors of production, can be classified in a number of ways, but it is common to group them according to certain characteristics which they possess. If we keep in mind that the production of goods and services is the result of people working with natural resources and with equipment such as tools, machinery and buildings, a generally acceptable classification can readily be derived. The traditional division of factors of production distinguishes labour, land and capital, with a fourth factor, enterprise, some-times separated from the rest.

The people involved in production use their skills and efforts to make things and do things that are wanted. This human effort is known as labour. In other words, labour represents all human resources. The natural resources people use are called land. And the equipment they use is called capital, which refers to all man-made resources.

The first three factors—land; labour and capital do not work independently or in isolation. There is need to combine these factors and co-ordinate their activities. This two-fold function is performed by the organizer or the entrepreneur.

But this is not the only function of the entrepreneur. In fact, production can never take place without some risk being involved; the decision to produce something has to be taken in anticipation of demand and there must be some element of uncertainty about that demand materializing.

Thus, risk taking or enterprise can be considered as a fourth factor of production, and those responsible for taking these risks are usually referred to as entrepreneurs (see the box below which is self-explanatory). We may now study the nature and characteristics of four factors against this backdrop. But before we proceed further we may make a passing reference to factor mobility.



(1) Land and Natural Resources:

Land is the gift of nature and includes the dry surface of the earth and the natural resources on or under the earth's surface, such as forests, rivers, sunlight, etc.

Land is utilised to produce income called rent. Land is available in fixed quantity; thus, does not have a supply price. This implies that the change in price of land does not affect its supply. The return for land is called rent.

In Economics the term land is used in a broad sense to refer to all natural resources or gifts of nature. As the Penguin Dictionary of Economics has put it: **"Land in economics is taken to mean not simply that part of the earth's surface not covered by water,**

but also all the free gifts of nature's such as minerals, soil fertility, as also the resources of sea. Land provides both space and specific resources".

From the above definition, it is quite clear that land includes farming and building land, forests, and mineral deposits. Fisheries, rivers, lakes, etc. all those natural resources (or gifts of nature) which help us (the members of the society) to produce useful goods and services. In other words, land includes not only the land surface, but also the fish in the sea, the heat of the sun that helps to dry grapes and change them into resins, the rain that helps farmers to grow crops, the mineral wealth below the surface of the earth and so on.

Characteristics which would qualify a given factor to be called land

- Land is a free gift of nature
- Land is permanent and has indestructible powers
- Land is a passive factor
- Land is immobile
- Land has multiple uses
- Land is heterogeneous

Some more Characteristics of land :

Land has certain important characteristics:

1. Fixed supply:

The total land area of earth (in the sense of the surface area available to men) is fixed. Therefore, the supply of lands is strictly limited. It is, no doubt, possible to increase the supply of land in a particular region to some extent through reclamation of land from sea areas or deforestation. But this is often offset by various kinds of soil erosion. The end result is that changes in the total area are really insignificant. Of course, the effective supply of agricultural (farm) land can be increased by drainage, irrigation and use of fertilisers.

In consequence, the prices of land and natural resources tend to be extremely sensitive to changes in consumer demand, rising sharply if they become more desirable. In this context, we may refer to the sharp increase in the price of building land in Bombay in the last five decades. However, new discoveries are often stimulated by high prices (as in the case of Calcutta's Salt Lake area), and like that of oil in the U.K.'s North Sea, which tend to moderate price increases.

2. Alternative uses:

Although the total supply of land is fixed, land has alternative uses. The same plot of land can be used to set up factories or to grow wheat or sugarcane or even to build a stadium. This means that the supply of land to a particular use is fairly (if not completely) elastic. For example, the amount of land used for growing tomato can be increased by growing less of some other crop (e.g., cauliflower). The supply of building land can be increased by reducing the area under agricultural operation.

3. No cost of production:

Since land is a gift of nature, it has no cost of production. Since land is already in existence, no costs are to be incurred in creating it. In this sense, land differs from both labour (which has to be reared, educated and trained) and capital (which has to be created by using labour and other scarce resources or by spending money).

So, it logically follows that the entire return from land—called rent—is a surplus income (at least from society's point of view). As Stanlake has rightly put it, "any increase in the value of natural resources due to rising populations and rising incomes accrues to the owners of these resources as a windfall gain—it does not arise from any efforts on their part".

However, the above argument is not valid today. In fact, much of the services of land required expenditure of resources to obtain or maintain them and hence they are often called capital (i.e. produced means of production). So is land, as a factor of production, 'really distinct' from capital.

4. Differences in fertility:

Another important feature of land is that it is not homogeneous. All grades (plots) of land are not equally productive or fertile. Some grades of land are more productive than others. And Ricardo argued that rent arises not only due to scarcity of land as a factor but also due to differences in the fertility of the soil.

5. Operation of the law of diminishing return:

Finally, we may refer to a special feature of land, not shared by other factors. In fact, production on land is subject to the operation of the law of diminishing return. As Alfred Marshall has put it "while the part which nature plays in production shows a tendency to diminishing return, the part which man plays shows a tendency to increasing return".

This simply means that as more and more workers are employed on the same plot of land, output per worker will gradually fall (because each additional worker will make less and less contribution to total product). The law of diminishing return refers to diminishing marginal product of the variable factor.

Mobility:

Land is not geographically mobile. But, it is occupationally mobile. In most parts of India, for example, land has many alternative uses. It might be used for farmland, roads, rail-ways, airlines, public parks, playgrounds, residential housing, office buildings, shopping complex, and so on. Some of the land, for example, in hill area, of say, Shillong, or Darjeeling, has an extremely limited degree of occupational mobility, being useful perhaps for sheep grazing, golf course or as a centre of tourism.

Return:

The income received by the owner of land is known as rent. It may be noted that rent is usually paid for something more than the use of land or another natural resource, but includes also an element of payment for another factor which is involved in making the resource available in a usable form.

Labour

An example of this is the labour which assists in the process of bringing minerals to the surface. Iron ore is of no use while it is still under the ground. Productivity and value of land can be increased if it is improved with fertilisers, irrigation and the erection of fences and buildings. So rent paid for this kind of fertile land is rather a mixed type of factor income.

Like land, labour is also a primary factor of production. The distinctive feature of the factor of production, called labour, is that it provides a human service. It refers to human effect of any kind—physical and mental— which is directed to the production of goods and services. ‘Labour’ is the collective name given to the productive services embodied in human physical effort, skill, intellectual powers, etc.

As such, there are different types of labour input, varying in effort and skill content, and in particular types of skill content. Thus, like ‘land’, labour is not homogeneous. The term covers clerical, managerial and administrative functions as well as skilled and unskilled manual work.

Labour is the physical and mental efforts of human beings that undertake the production process.
It includes unskilled, semi-skilled and highly skilled labour. The supply of labour is affected by the change in its prices. It increases with an increase in wages. The return for labour is called wages and salary.

Characteristics of labour:

- Human Effort
- Labour is perishable
- Labour is an active factor
- Labour is inseparable from the labourer
- Labour power differs from labourer to labourer
- All labour may not be productive
- Labour has poor bargaining power
- Labour is mobile
- There is no rapid adjustment of supply of labour to the demand for it
- Choice between hours of labour and hours of leisure

Land and Labour:

Labour differs from land in an important way. While land is a stock, labour is a flow. The term 'labour' is used to refer to the flow of labour service per unit of time. So labour is perishable. If we do not make use of today's labour power, a correspondingly large amount is not made available tomorrow (and in future).

A related, but important point should be noted in this context. The worker sells his services in the market, but retains his capital (working ability). In other words, what is bought and sold is the service of labour, not labour itself. A firm cannot buy and sell labour in the same way that it can buy land and capital.

Dual Role:

Another important point to note is that labour is not only a factor of production. The supplier of labour—the worker—is also a consumer. Thus, labour plays a dual role in a modern economy. Labour is both the subject and the object of production.

This means two things:

(1) That the production of anything requires the use of labour as a factor, and

(2) That almost everything is produced to satisfy the needs of the workers, who are the main consumers. In fact, any economic activity takes place to satisfy the consumers. And, consumption demand provides the business people with the incentive to undertake production.

Peculiarities of Labour as a Factor:

In examining labour markets, it is important to recognise that labour has a number of special characteristics which distinguish it from ordinary commodities.

1. First, labour market transactions are particularly significant for:

First, labour market transactions are particularly significant for the individual worker. Much of a person's life style and relations with other people depend on the job he or she does. Furthermore, the employment of labour involves a continuing personal relation-ship between employers and employees, whereas transactions in market for goods are often brief and impersonal.

2. Labour is an end and means in itself:

A commodity is only a means of production and the object of production is its consumption by labour. Labour, therefore, becomes a means to its own end.

3. Thirdly, the individual sells his services but not himself:

The employer, however, must be able to exert some control or authority over the actions of employees. This is not a very simple matter, which can be covered unambiguously by a contract of employment. A great deal of energy has been devoted to planning systems for the direction of employees, and even a brief examination of the state of industrial relations in most countries shows that still much remains to be done.

4. Labour is inseparable from the labourer:

In other words, labour and the labourer go together. When the seller sells a commodity he does not necessarily go with the commodity. But the labour can supply his labour only when he goes with it. Moreover, when a seller sells a commodity he parts with it. But when a labourer sells his labour, he retains the quality with him. He may gain the satisfaction of his services, but he cannot be separated from the labour.

5. Fifthly, the individual must be present when the labour services are used and thus a fifth feature is that labour services are not transferable:

For example, a person who has agreed to carry out certain tasks cannot transfer his services to someone else to do the work, while he does something else. This contrasts with commodities which can be transferred among individuals.

One consequence of having to 'deliver' the services personally is that employees have strong views on how their services should be used. Working conditions are of central

importance to workers. It also means that workers must live near their place of work. The location may significantly affect labour market decisions.

6. Sixthly, labour services cannot be stored:

Labour cannot be 'saved' or stored for future use (although rest may enhance performance to some extent).

7. Labour is perishable:

A commodity, if it is not disposed off today, can be disposed off the next day and it may not lose its value. Labour, however, is perishable in this that if the labourer is not able to sell his services for a day he cannot get the value for that day. It is lost forever; it is because of this that labour has a weak bargaining power.

8. Labour is affected by surroundings:

A commodity is usually very much affected by its surrounding; a labourer is very much affected by the surroundings because he is a living being. Therefore, any change in atmosphere has an effect on his health feelings etc.

9. The supply of labour is independent of its demand:

In case of most commodities we see that supply usually varies with demand but in case of labour its supply is in no way related to demand. Both are determined by different factors.

10. Finally, labour services are enhanced by training:

Skill acquisition is often a lengthy and costly process. However, adjustments in the labour market, such as increasing the supply of a particular skill, often requires a long time. This also means that individuals do not usually train for more than one occupation as they only have a limited working life over which to justify the investment.

Mobility of Labour:

The mobility of labour has two aspects:

(a) The spatial or geographical mobility of labour, which relates to the rate at which workers move between geographical areas and regions in response to differences in wages and job availability (e.g., a worker from West Bengal moving to Mumbai) and

(b) The occupational mobility of labour which relates to the extent to which workers change occupations or skills in response to differences in wages or job availability (e.g., a jute mill worker joining a tea garden).

It may apparently seem that labour is the most mobile of all factors—both occupationally and geographically. Workers can move both freely from one industry to another and from one region to another.

Reward:

The reward or price that is paid to labour in return for the services it performs is known as a wage or salary. A man's wages are associated with his productivity or efficiency and this, in its turn, depends on a variety of factors including the education and job training he has received, his innate skill and the extent to which he is motivated to put his best effort in the work he is doing.

In general, the supply of labour varies directly with wages and compensation. Normally, when wages are relatively low, increases in wages will tend to lead to an increase in the supply of labour. However, as wages continue to rise a stage ultimately comes when higher wages (incomes) make leisure more attractive.

When incomes are relatively high, therefore, higher wage rates may actually lead to a fall in the number of hours worked (and, thus, in the amount of labour offered by an individual worker.) This is why the supply curve of labour bends back to the left and this is often cited as an important exception to the (empirical) law of supply.

(3) Capital:

Capital is the wealth created by human beings. It is one of the important factor of production of any kind of goods and services, as production cannot take place without the involvement of capital.

Capital is an output of a production process that goes into another production process as an input. Capital as a factor of production is divided into two parts, namely, physical capital and human capital.

Physical capital includes tangible resources, such as buildings, machines, tools and equipment, etc.

Human capital includes knowledge and skills of human resource, which is gained by education, training and experience. Return for capital is termed as interest.

Capital, the third agent or factor is the result of past labour and it is used to produce more goods. Capital has, therefore, been defined as 'produced means of production.' It is a man-made resource. In a board sense, any product of labour-and-land which is reserved for use in future production is capital.

The business-person thinks of money as capital because he can easily convert money into real resources like tools, machines and raw materials, and use these resources for the production of goods. Also capital is measured in terms of money. So the amount of resources used or possessed by a business-person is conveniently expressed as a sum of money.

Types of Capital

- Fixed capital
- Circulating capital
- Real capital
- Human capital
- Tangible capital
- Individual capital
- Social Capital

Classification of Capital:

Capital can be classified in two broad categories that which is used up in the course of production and that which is not.

Fixed and Circulating Capital:

Fixed capital means durable capital like tools, machinery and factory buildings, which can be used for a long time. Things like raw materials, seeds and fuel, which can be used only once in production are called circulating capital. Circulating capital refers to funds embodied in stocks and work-in- progress or other current assets as opposed to fixed assets. It is also called working capital.

Two Features of Capital:

Two important features of capital are:

Firstly, it entails a sacrifice, since resources are devoted to making non-consumable capital goods instead of goods for immediate consumption. Secondly, it enhances the productivity of the other factors, viz., land and labour.

In fact, it is this enhanced productivity which represents the reward for the sacrifice involved in creating capital. Hence we can predict that new capital is only created so long as its productivity is at least sufficient to compensate those who make the sacrifices involved in its creation. These two features may now be discussed in detail.

Capital Formation:

People use capital goods like machines, equipment, etc. because capital goods are the creators of other goods. But this is not the whole truth. People use capital for another important reason to produce goods with less effort and lower costs than would be the case if labour were not assisted by capital. But in order to use capital goods people must first produce them. This calls for a sacrifice of current consumption.

When people use their labour to produce capital goods like textile producing machines, they can use the same labour for producing consumer goods like textiles. As Stanlake has put it "The opportunity cost of the capital goods is the potential output of consumer goods which has to be foregone in order to produce that capital, the production of capital demands abstinence from current consumption."

Factors Affecting Capital Formation:

The creation of capital depends on two things:

(a) Savings and (b) a diversion of resources (from the production of consumption goods to meet current needs to the production of capital goods to meet future needs). Saving is the difference between current income and current consumption. In other words, it is the act of foregoing current consumption.

It means that resources otherwise used to produce consumer goods are set aside for producing capital goods. If people choose not to buy some consumer goods, with some part of their current income, they refrain from buying (utilising) the services of the factors required to make those goods.

These factors might, therefore, remain idle. But these savings may be borrowed and utilised by business firms (entrepreneurs) to finance the construction of capital goods. This is the second step—the diversion of resources for the production of consumer goods to the production of capital (producers) goods. It may be noted that savings make possible capital accumulation. It does not cause it.

In short, capital formation depends on savings, which, in its turn, depends on two things:

(1) The capacity to save and

(2) The desire to save.

The capacity to save depends on income and the existence of savings institutions like banks, insurance companies, post offices, stock exchanges, etc. If income is low,

savings will also be low. Even if income is high savings will be low in the absence of the above-mentioned savings institutions.

The desire to save depends on

(1) the rate of interest and (2) stability in the value of money (i.e., the rate of inflation).

If the rate of interest is high people will be eager to save more by curtailing their current consumption. People will also be eager to save more if they expect that there will exist reasonable price stability in the economy in future.

Mobility of Capital:

Capital is both geographically and occupationally mobile. However, a certain portion of a nation's capital stock which consists of such things as railway networks, blast furnaces and shipyards are highly specialised equipment and are virtually immobile in the geographical sense. It is physically possible to dismantle them and move them to different sites or locations, but the cost of doing so will be so great that it will not be economically feasible to do so.

Such equipment are not even occupationally mobile. Each such equipment can only be used for a specific purpose. Many buildings however, can be put to better uses. Many of the old buildings used as cinema house or god-owns in northern area of Calcutta have been dismantled and converted into multi-storeyed buildings.

Some capital equipment is mobile in both the geographical and occupational sense. Examples of such capital equipment are electric motors, machine tools, hand tools, typewriters, and lorries. Such equipment can be used effectively in a wide variety of industries and are capable of moving from one location to another at very little cost.

Return:

The earning of capital, i.e., the price that has to be paid for it, is known as interest. If it stated as percentage of the principal, representing the sum paid by a borrower who needs finance to purchase a piece of capital equipment.

(4) Enterprise (Organisation):

Meaning:

Organisation, as a factor of production, refers to the task of bringing land, labour and capital together. It involves the establishment of co-ordination and co-operation among these factors. The person in charge of organisation is known as an organiser or an

entrepreneur. So, the entrepreneur is the person who takes the charge of supervising the organisation of production and of framing the necessary policy regarding business.

Entrepreneur

Entrepreneurship consists of three major functions, viz., coordination, management and supervision. An entrepreneur is a person who creates an enterprise. The success or failure depends on the efficiency of the entrepreneur.

An enterprise is an organisation that undertakes commercial purposes or business ventures and focuses on providing goods and services. An enterprise is composed of individuals and physical assets with a common goal of generating profits.

Functions of an entrepreneur

- Initiating business enterprise and resource co-ordination
- Risk bearing or uncertainty bearing
- Innovations

Functions or Role of the Entrepreneur in detail :

The entrepreneur in modern business performs the following useful functions:

1. Decision-making:

The primary task of an entrepreneur is to decide the policy of production. An entrepreneur is to determine what to produce, how to produce, where to produce, how much to produce, how to sell and so forth. Moreover, he is to decide the scale of production and the proportion in which he combines the different factors he employs. In brief, he is to make vital business decisions relating to the purchase of productive factors and to the sales of the finished goods or services.

2. Management Control:

Earlier writers used to consider management control one of the chief functions of the entrepreneur. Management and control of the business are conducted by the entrepreneur himself. So the latter must possess a high degree of management ability to select the right type of persons to work with him. But the importance of this function has declined, as the business nowadays is managed more and more by paid managers.

3. Division of income:

The next major function of the entrepreneur is to make necessary arrangement for the division of total income among the different factors of production employed by him. Even if there is a loss in the business, he is to pay rent, interest; wages and other contractual income out of the realised sale proceed.

4. Risk-taking and uncertainty-bearing:

Risk-taking is perhaps the most important function of an entrepreneur. Modern production is very risky as an entrepreneur is required to produce goods or services in anticipation of their future demand. Broadly, there are two kinds of risk which he has to face.

Firstly, there are some risks, such as risks of fire, loss of goods in transit, theft, etc., which can be insured against. These are known as measurable and insurable risks. Secondly, some risks, however, cannot be insured against because their probability cannot be calculated accurately. These constitute what is called uncertainty (e.g., competitive risk, technical risk, etc.). The entrepreneur undertakes both these risks in production.

5. Innovation:

Another distinguishing function of the entrepreneur as emphasised by Schumpeter, is to make frequent inventions- invention of new products, of new techniques and discovering new markets—to improve his competitive position, and to increase earnings.

Importance of Enterprise:

The above description indicates the supreme position of the entrepreneur in production. This is particularly true in the capitalistic or even mixed economy which is based on the price-profit system. In the socialistic economy, the state becomes the entrepreneur; the scope of private entrepreneur is extremely limited in such an economy.

It is to be noted that the importance of the entrepreneur has been declining with the growth of joint-stock business and state-undertakings. This is due to the fact that risk is borne by the shareholders and the day-by-day control of the business is generally in the hands of salaried managers or managing directors.

A Separate Factor:

Some economists feel that the above entrepreneurial functions are no different from those of a particular and specialised form of labour. They point out that risk- bearing is not something peculiar to the entrepreneur.

Many types of labour have to take risk. For example, the miner or the air- hostess runs the risk of personal injury and life and most forms of labour run the risk of unemployment. But enterprise is a separate factor because the first three factors are

substitutable to some extent, but the fourth factor is a specific factor and cannot be substituted by any other factor.

Mobility:

Enterprise seems to be the most mobile of all the four factors. There is need to train labour for some specific task to be performed in a particular industry (say, road transport service, hotel business or computer operation). Once labour is trained for some specific task appropriate to some particular industry, it cannot be easily and quickly transferred to some other industry to do a completely different job. But the basic functions of the entrepreneur-organisation, management and risk-taking are the same in all industries.

Whatever the nature, duration and extent of economic activity and entrepreneur has to raise capital to organise the factors of production, and take certain fundamental decisions on what, how and where to produce. The efficient operation of an enterprise, irrespective of its nature and form, depends on certain human relations and human qualities such as initiative, leadership organisational ability and controlling capacity.

Very few people have these rare qualities. But those who have such qualities are able to operate effectively and efficiently in almost any industry.

Return:

The return to the entrepreneur is profit. Profit is the reward for successful conduct of business.

Concepts of Total Product, Average product and Marginal Product

Total Product

In simple terms, we can define Total Product as the total volume or amount of final output produced by a firm using given inputs in a given period of time.

Marginal Product

The additional output produced as a result of employing an additional unit of the variable factor input is called the Marginal Product. Thus, we can say that marginal product is the addition to Total Product when an extra factor input is used.

Marginal Product = Change in Output/ Change in Input

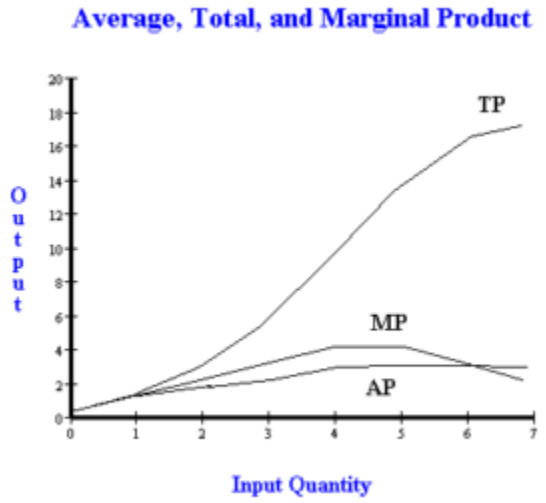
Thus, it can also be said that Total Product is the summation of Marginal products at different input levels.

Total Product = Σ Marginal Product

Average Product

It is defined as the output per unit of factor inputs or the average of the total product per unit of input and can be calculated by dividing the Total Product by the inputs (variable factors).

Average Product = Total Product/ Units of Variable Factor Input



Relationship between Marginal Product and Total Product

The **law of variable proportions** is used to explain the relationship between Total Product and Marginal Product. It states that when only one variable factor input is allowed to increase and all other inputs are kept constant, the following can be observed:

- When the Marginal Product (MP) increases, the Total Product is also increasing at an increasing rate. This gives the Total product curve a convex shape in the beginning as variable factor inputs increase. This continues to the point where the MP curve reaches its maximum.
- When the MP declines but remains positive, the Total Product is increasing but at a decreasing rate. Thisgiveends the Total product curve a concave shape after the **point of inflexion**. This continues until the Total product curve reaches its maximum.
- When the MP is declining and negative, the Total Product declines.
- When the MP becomes zero, Total Product reaches its maximum.

Relationship between Average Product and Marginal Product

There exists an interesting relationship between Average Product and Marginal Product. We can summarize it as under:

- When Average Product is rising, Marginal Product lies above Average Product.
- When Average Product is declining, Marginal Product lies below Average Product.
- At the maximum of Average Product, Marginal and Average Product equal each other.

Production Function

The function that explains the relationship between physical inputs and physical output (final output) is called the production function. We normally denote the production function in the form:

$$Q = f(X_1, X_2)$$

where Q represents the final output and X_1 and X_2 are inputs or factors of production.

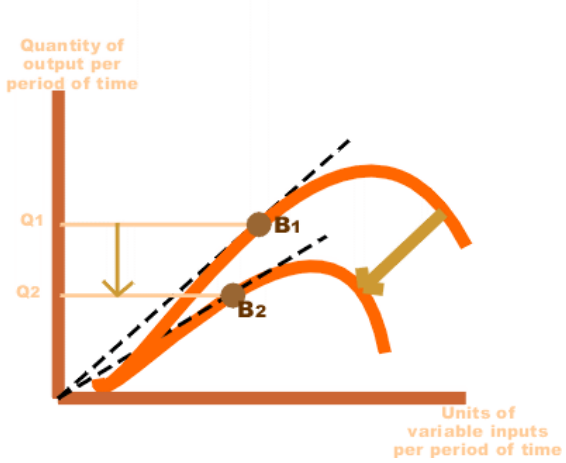
What is the Production Function?

The functional relationship between physical inputs (or factors of production) and output is called production function. It assumed inputs as the explanatory or independent variable and output as the dependent variable. Mathematically, we may write this as follows:

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

Here, 'Q' represents the output, whereas 'L' and 'K' are the inputs, representing labour and capital (such as machinery) respectively. Note that there may be many other factors as well but we have assumed two-factor inputs here.

Time Period and Production Functions



The production function is differently defined in the *short run* and in the *long run*. This distinction is extremely relevant in microeconomics. The distinction is based on the nature of factor inputs.

Those inputs that vary directly with the output are called *variable factors.* These are the factors that can be changed. Variable factors exist in both, the short run and the long run. Examples of variable factors include daily-wage labour, raw materials, etc.

On the other hand, those factors that cannot be varied or changed as the output changes are called *fixed* factors. These factors are normally characteristic of the short run or short period of time only. Fixed factors do not exist in the long run.

Consequently, we can define two production functions: short-run and long-run. The *short-run production function* defines the relationship between one variable factor (keeping all other factors fixed) and the output. The law *of returns to a factor* explains such a production function.

For example, consider that a firm has 20 units of labour and 6 acres of land and it initially uses one unit of labour only (variable factor) on its land (fixed factor). So, the land-labour ratio is 6:1. Now, if the firm chooses to employ 2 units of labour, then the land-labour ratio becomes 3:1 (6:2).

The *long-run production function* is different in concept from the short run production function. Here, all factors are varied in the same proportion. The law that is used to explain this is called the *law of returns to scale*. It measures by how much proportion the output changes when inputs are changed proportionately.

Law of Variable Proportions

The Law of Variable Proportions or Returns to a Factor plays an important role in the study of the Theory of Production. In this article, we will look at the meaning, explanation, stages, significance, and reasons behind the operation of the Law of Variable Proportions.

Law of Variable Proportions or Returns to a Factor

This law exhibits the short-run production functions in which one factor varies while the others are fixed.

Also, when you obtain extra output on applying an extra unit of the input, then this output is either equal to or less than the output that you obtain from the previous unit.

The Law of Variable Proportions concerns itself with the way the output changes when you increase the number of units of a variable factor. Hence, it refers to the effect of the changing factor-ratio on the output.

In other words, the law exhibits the relationship between the units of a variable factor and the amount of output in the short-term. This is assuming that all other factors are constant. This relationship is also called returns to a variable factor.

The law states that keeping other factors constant, when you increase the variable factor, then the total product initially increases at an increases rate, then increases at a diminishing rate, and eventually starts declining.

Why is it called the Law of Variable Proportions?

As one input varies and all others remain constant, the factor ratio or the factor proportion varies. Let's look at an example to understand this better:

Let's say that you have 10 acres of land and 1 unit of labour for production. Therefore, the land-labour ratio is 10:1. Now, if you keep the land constant but increase the units of labour to 2, the land-labour ratio becomes 5:1.

Therefore, as you can see, the law analyses the effects of a change in the factor ratio on the amount of out and hence called the Law of Variable Proportions.

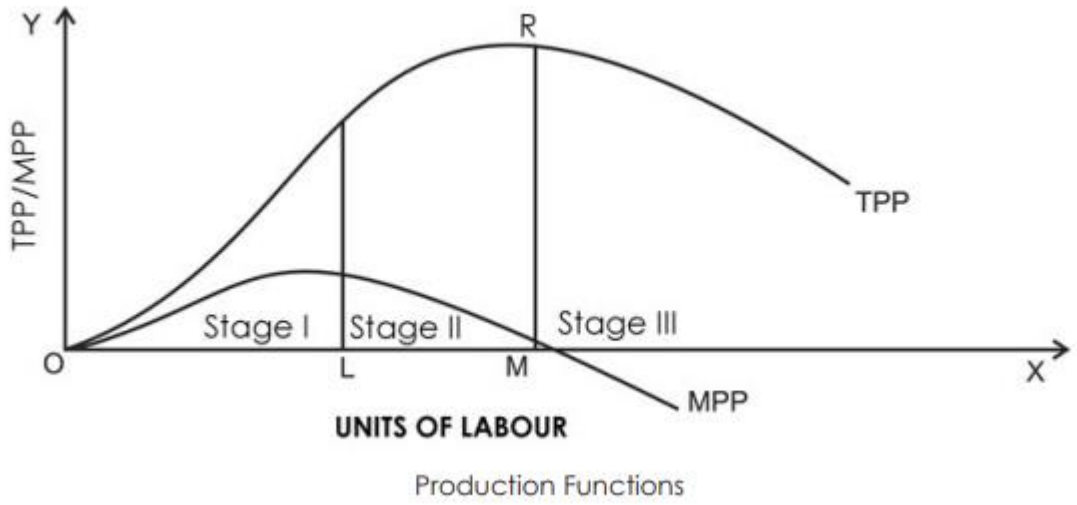
Law of Variable Proportions Explained

Let's understand this law with the help of another example:

Fixed Factor : Land (Acres)	Variable Factor: Land (Units)	TPP (Total Physical Product) (Quantity)	MPP (Marginal Physical Product) (Quantity)	
1	0	0	-	
1	1	2	2	Stage I
1	2	6	4	
1	3	12	6	
1	4	16	4	Stage II
1	5	18	2	
1	6	18	0	
1	7	14	-4	Stage III
1	8	8	-6	

In this example, the land is the fixed factor and labour is the variable factor. The table shows the different amounts of output when you apply different units of labour to one acre of land which needs fixing.

The following diagram explains the law of variable proportions. In order to make a simple presentation, we draw a Total Physical Product (TPP) curve and a Marginal Physical Product (MPP) curve as smooth curves against the variable input (labour).



Production Functions

Three Stages of the Law

The law has three stages as explained below:

1. **Stage I** – The TPP increases at an increasing rate and the MPP increases too. The MPP increases with an increase in the units of the variable factor. Therefore, it is also called the stage of increasing returns. In this example, the Stage I of the law runs up to three units of labour (between the points O and L).
2. **Stage II** – The TPP continues to increase but at a diminishing rate. However, the increase is positive. Further, the MPP decreases with an increase in the number of units of the variable factor. Hence, it is called the stage of diminishing returns. In this example, Stage II runs between four to six units of labour (between the points L and M). This stage reaches a point where TPP is maximum (18 in the above example) and MPP becomes zero (point R).
3. **Stage III** – Now, the TPP starts declining, MPP decreases and becomes negative. Therefore, it is called the stage of negative returns. In this example, Stage III runs between seven to eight units of labour (from the point M onwards).

Significance of the three stages

Stage I

A producer does not operate in Stage I. In this stage, the marginal product increases with an increase in the variable factor.

Therefore, the producer can employ more units of the variable to efficiently utilize the fixed factors. Hence, the producer would prefer to not stop in Stage I but will try to expand further.

Stage III

Producers do not like to operate in Stage III either. In this stage, there is a decline in total product and the marginal product becomes negative.

In order to increase the output, producers reduce the amount of variable factor. However, in Stage III, he incurs higher costs and also gets lesser revenue thereby getting reduced profits.

Stage II

Any rational producer avoids the first as well as third stages of production. Therefore, producers prefer Stage II – the stage of diminishing returns. This stage is the most relevant stage of operation for a producer according to the law of variable proportions.

Viva Question-
Q1. What is the law of variable proportions?
Answer: The law of variable proportions is as follows:
"If a producer increases the units of a variable factor while keeping other factors fixed, then initially the total product increases at an increasing rate, then it increases at a diminishing rate, and finally starts declining."

Iso-quant Curve

Definition: An **Iso-quant Curve** shows all the possible combinations of input factors that yield the same quantity of production. In other words, an iso-quant curve is a geometric representation of the production function, wherein different combinations of labor and capital are employed to have the same level of output.

The iso-quant curve is also known as **Iso-Product Curve**. The term **"Iso"** means same and **"quant"** or **"product"** means quantity produced.

The slope of an iso-quant curve is called the **rate of technical substitution,** which means how much capital are to be substituted for the labor to give the same quantity of production if the labor is reduced by 1 unit. Thus, the input factors can be substituted for one another to have an unchanged level of output.

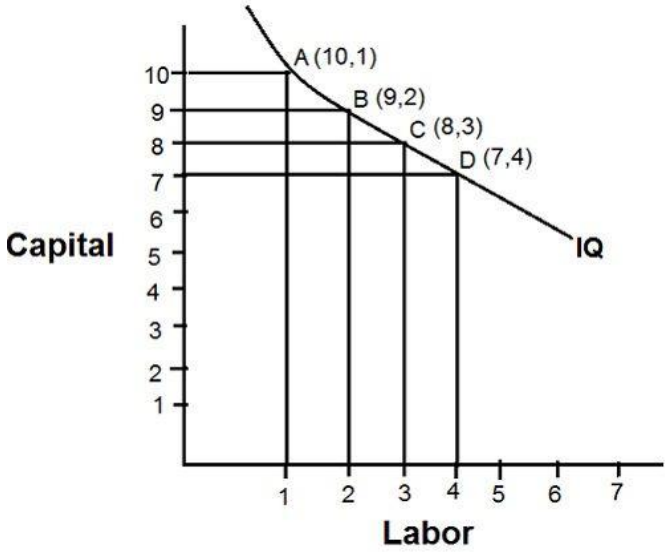
Assumptions of Iso-quant Curve

- Only two factors of production Viz. Labor and capital are taken into the consideration.
- These factors can be substituted for each other.
- The factors of production can be divided into small parts.
- It is assumed that technology remains constant.
- The shape of the Iso-quant depends on the level of substitutability between the factors of production.

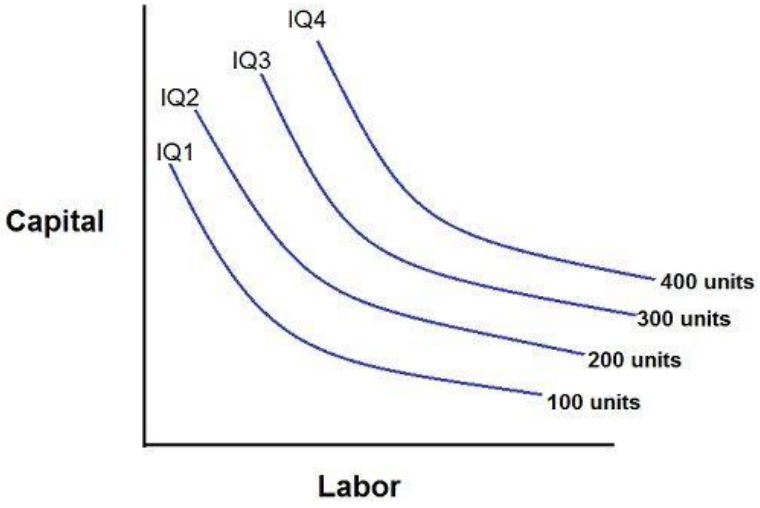
The concept of Iso-quant can be further comprehended through an illustration below:

Suppose there are two input factors Viz. Labor and Capital. The different combinations of these factors are used to have the same level of output as shown in the schedule below:

Combination	Labor (unit)	Capital (Unit)	Output (Number)
A	1	10	100
B	2	9	100
C	3	8	100
D	4	7	100



Iso-quant Map: An iso-quant map shows the different iso-quant curves representing the different combinations of factors of production, yielding the different levels of output. Thus, higher the iso-quant curve, the higher is the level of output.



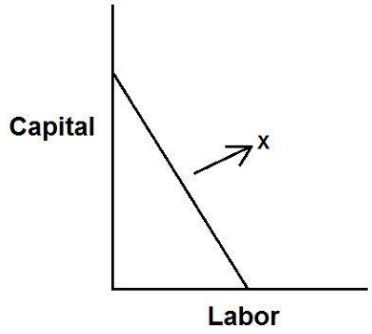
Types of Iso-quant Curves

Definition: An **Iso-Quant** curve is the geometrical representation of the different combinations of input factors employed to produce the given level of output.

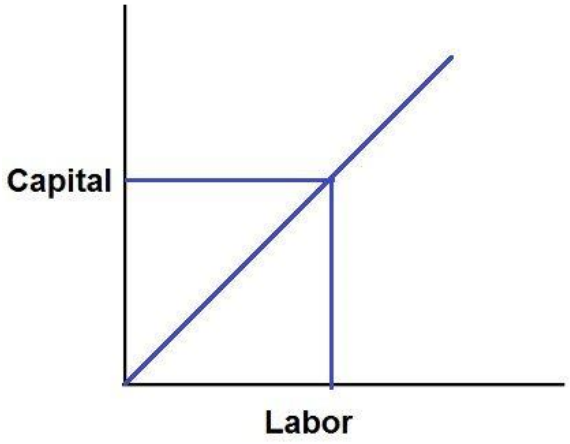
Types of Iso-quant Curves

The iso-quant curves can be classified on the basis of the substitutability of factors of production. These are:

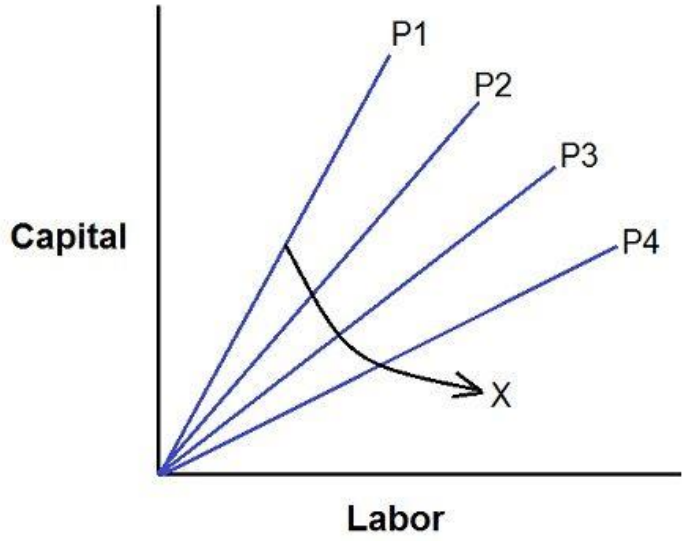
1. Linear Iso-quant Curve: This curve shows the perfect substitutability between the factors of production. This means that any quantity can be produced either employing only capital or only labor or through “n” number of combinations between these two.



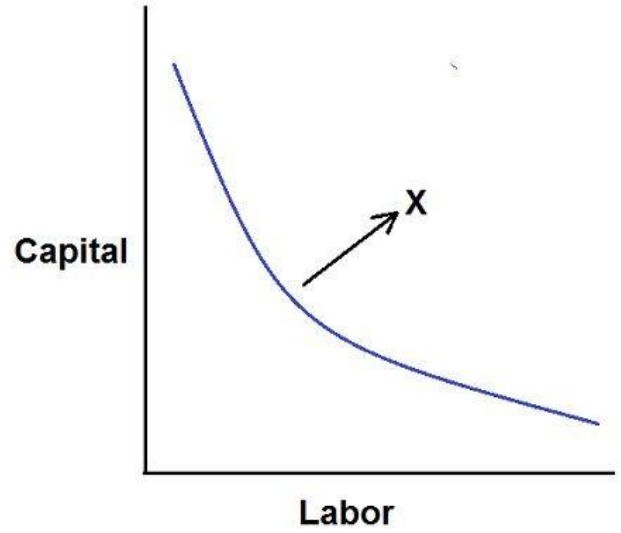
2. Right Angle Iso-quant Curve: This is one of the types of iso-quant curves, where there is a strict complementarity with no substitution between the factors of production. According to this, there is only one method of production to produce any one commodity. This curve is also known as **Leontief Iso-quant**, **input-output isoquant** and is a right angled curve.



3. Kinked iso-quant Curve: This curve assumes, that there is a limited substitutability between the factors of production. This shows that substitution of factors can be seen at the kinks since there are a few processes to produce any one commodity. Kinked iso-quant curve is also known as **activity analysis programming iso-quant** or **linear programming iso-quant**.



4. Convex Iso-quant Curve: In this types of iso-quant curves, the factors can be substituted for each other but up to a certain extent. This curve is smooth and convex to the origin.



Thus, the classification of the iso-quant curve can be done on the basis of the number of labor units that can be substituted for capital and vice-versa, so as to have the same level of production.

- Short Run Production Function and
- Long Run Production Function

Production function may be classified into two:

1. Short-run production function which is studied through Law of Variable Proportions
2. Long-run production function which is explained by Returns to Scale

Short-run production function - The law of variable proportions

The law examines the relationship between one variable factor and output, keeping the quantities of other factors fixed.

Definition

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.

Assumptions of the law

The law is based on the following assumptions

1. Only one factor is made variable and other factors are kept constant.
2. This law does not apply in case all factors are proportionately varied. i.e. where the factors must be used in rigidly fixed proportions to yield a product.
3. The variable factor units are homogenous i.e. all the units of variable factors are of equal efficiency.
4. Input prices remain unchanged
5. The state of technology does not change or remains the same at a given point of time.
6. The entire operation is only for short-run, as in the long-run all inputs are variable.

Three stages of law

1. The behaviour of the output when the varying quantity of one factor is combined with a fixed quantity of the other can be divided into three stages. They are Increasing returns stage
2. Decreasing returns stage
3. Negative returns stage

Stage I: Stage of increasing returns

Stage I ends where the average product reaches its highest (maximum) point. During this stage, the total product, the average product and the marginal product are increasing. It is notable that the marginal product in this stage increases but in a later part it starts declining. Though marginal product starts declining, it is greater than the average product so that the average product continues to rise.

Stage II: Stage of decreasing returns

Stage II ends at the point where the marginal product is zero. In the second stage, the total product continues to increase but at a diminishing rate. The marginal product and the average product are declining but are positive. At the end of the second stage, the total product is maximum and the marginal product is zero.

Stage III: Stage of negative returns

In this stage the marginal product becomes negative. The total product and the average product are declining.

The stage of Operation

In stage I the fixed factor is too much in relation to the variable factor. Therefore in stage I, marginal product of the fixed factor is negative. On the other hand, in stage III the marginal product of the variable factor is negative. Therefore a rational producer will not choose to produce in stages I and III. He will choose only the second stage to produce where the marginal product of both the fixed factor and variable factor are positive. At this stage the total product is maximum. The particular point at which the producer will decide to produce in this stage depends upon the prices of factors. The stage II represents the range of rational production decisions.

Long-run production function - Returns to Scale

In the long run, all factors can be changed. Returns to scale studies the changes in output when all factors or inputs are changed. An increase in scale means that all inputs or factors are increased in the same proportion.

Three phases of returns to scale

The changes in output as a result of changes in the scale can be studied in 3 phases. They are

1. Increasing returns to scale
2. Constant returns to scale
3. Decreasing returns to scale

1. Increasing returns to scale

If the increase in all factors leads to a more than proportionate increase in output, it is called increasing returns to scale. For example, if all the inputs are increased by 5%, the output increases by more than 5% i.e. by 10%. In this case the marginal product will be rising.

2. Constant returns to scale

If we increase all the factors (i.e. scale) in a given proportion, the output will increase in the same proportion i.e. a 5% increase in all the factors will result in an equal proportion of 5% increase in the output. Here the marginal product is constant.

3. Decreasing returns to scale

If the increase in all factors leads to a less than proportionate increase in output, it is called decreasing returns to scale i.e. if all the factors are increased by 5%, the output will increase by less than 5% i.e. by 3%. In this phase marginal product will be decreasing.

Figure explains the different phases of returns to scale. When marginal product increases (AB), total product increases at an increasing rate. So there is increasing returns to scale. When Marginal Product remains constant (BC), Total Product increases at a constant rate and this stage is called constant returns to scale. When Marginal Product decreases (CMP), Total Product increases at a decreasing rate and it is called decreasing returns to scale.

Law of Returns to Scale : Definition, Explanation and Its Types

In the long run all factors of production are variable. No factor is fixed. Accordingly, the scale of production can be changed by changing the quantity of all factors of production.

Definition:

"The term returns to scale refers to the changes in output as all factors change by the same proportion." Koutsoyiannis

"Returns to scale relates to the behaviour of total output as all inputs are varied and is a long run concept". Leibhafsky

Returns to scale are of the following three types:

1. Increasing Returns to scale.
2. Constant Returns to Scale
3. Diminishing Returns to Scale

Explanation:

In the long run, output can be increased by increasing all factors in the same proportion. Generally, laws of returns to scale refer to an increase in output due to increase in all factors in the same proportion. Such an increase is called returns to scale.

Suppose, initially production function is as follows:

$P = f(L, K)$

Now, if both the factors of production i.e., labour and capital are increased in same proportion i.e., x, product function will be rewritten as.

$$P_1 = f(xL, xK)$$

1. If P_1 increases in the same proportion as the increase in factors of production i.e., $\frac{P_1}{P} = x$, it will be constant returns to scale.

2. If P_1 increases less than proportionate increase in the factors of production *i.e.*, $\frac{P_1}{P} < x$, it will be diminishing returns to scale.

3. If P_1 increases more than proportionate increase in the factors of production, *i.e.*, $\frac{P_1}{P} > x$, it will be increasing returns to scale. Returns to scale can be shown with the help of table 8.

Table 8. Showing different stages of return to scale

Units of Labour	Units of capital	%age increase in Labour & Capital	Total Product	%age increase in TP	Returns to scale
1	3	–	10	–	..
2	9	100%	30	200%	Increasing
3	9	50%	60	100%	
4	12	33%	80	33%	Constant
5	15	25%	100	25%	
6	18	20%	120	10%	Decreasing
7	21	16.6%	130	8.3%	

The above stated table explains the following three stages of returns to scale:

1. Increasing Returns to Scale:

Increasing returns to scale or diminishing cost refers to a situation when all factors of production are increased, output increases at a higher rate. It means if all inputs are doubled, output will also increase at the faster rate than double. Hence, it is said to be increasing returns to scale. This increase is due to many reasons like division external economies of scale. Increasing returns to scale can be illustrated with the help of a diagram 8.

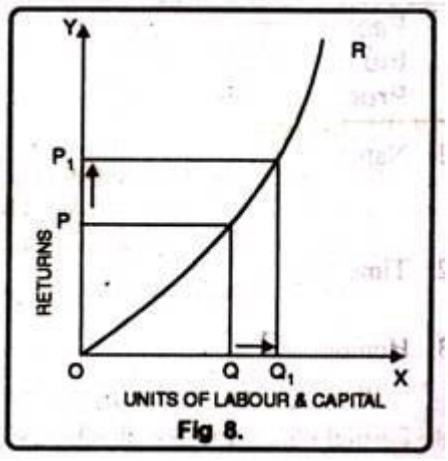


Fig 8.

In figure 8, OX axis represents increase in labour and capital while OY axis shows increase in output. When labour and capital increases from Q to Q_1, output also increases from P to P_1 which is higher than the factors of production i.e. labour and capital.

2. Diminishing Returns to Scale:

Diminishing returns or increasing costs refer to that production situation, where if all the factors of production are increased in a given proportion, output increases in a smaller proportion. It means, if inputs are doubled, output will be less than doubled. If 20 percent increase in labour and capital is followed by 10 percent increase in output, then it is an instance of diminishing returns to scale.

The main cause of the operation of diminishing returns to scale is that internal and external economies are less than internal and external diseconomies. It is clear from diagram 9.

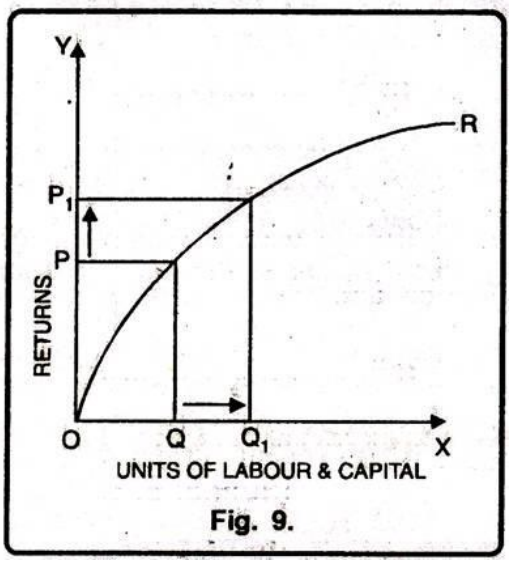


Fig. 9.

In this diagram 9, diminishing returns to scale has been shown. On OX axis, labour and capital are given while on OY axis, output. When factors of production increase from Q to Q_1 (more quantity) but as a result increase in output, i.e. P to P_1 is less. We see that increase in factors of production is more and increase in production is comparatively less, thus diminishing returns to scale apply.

3. Constant Returns to Scale:

Constant returns to scale or constant cost refers to the production situation in which output increases exactly in the same proportion in which factors of production are increased. In simple terms, if factors of production are doubled output will also be doubled.

In this case internal and external economies are exactly equal to internal and external diseconomies. This situation arises when after reaching a certain level of production, economies of scale are balanced by diseconomies of scale. This is known as homogeneous production function. Cobb-Douglas linear homogenous production function is a good example of this kind. This is shown in diagram 10. In figure 10, we see that increase in factors of production i.e. labour and capital are equal to the proportion of output increase. Therefore, the result is constant returns to scale.

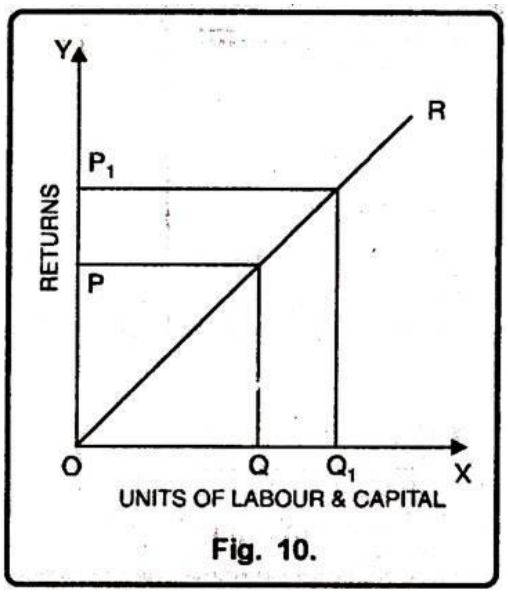


Fig. 10.

Theory of Cost

What is Cost?

According to the common usage, Cost is the fiscal value of commodities and facilities that manufacturers and customers buy. According to fundamental economic discern, the cost price is the estimate of the substitute opportunities bygone in the option of one commodity or pursuit over others. Such basic cost is normally mentioned as the opportunity cost. For customer with a constant earning (fixed income), the opportunity cost of buying a new household instrument, for instance, the value of a vacation not being executed.

More ordinarily, cost price has the association between the value of production inputs and the degree of output. TC (Total cost) price is mentioned to the total expend sustained in attaining a particular degree of output, if such TC is divided by the unit manufactured, aggregate or quantity cost is procured. A part of the total cost called as fixed cost – example, the cost prices of machinery – don't differ with the quantity manufactured; in the short run, doesn't change with changes in the unit manufactured. Variable costs, such as the costs of raw materials or labour, change with the degree of output.

A facet of cost significance in economic analysis is marginal cost or the addition to the total cost outcoming from the manufacture of an additional quantity of output. An enterprise wanting to maximize its worth and profit would, in theory, decide its degree of output by continuing manufacturing until the cost price of the last additional quantity manufactured (marginal cost) just equivalent to the addition to revenue (marginal revenue) procured from it.

Economic costs

There are certain costs that accounting costs disregard. These include money which the entrepreneur forgoes but would have earned had he invested his time, efforts and investments in other ventures. For example, the entrepreneur would have earned an income had he sold his services to others instead of working on his own business

Similarly, potential returns on the capital he employed in his business instead of giving it to others, the output generated by his resources which he could have used for others' benefits, etc. are other examples of economic costs.

Economic costs help the entrepreneur calculate supernormal profits, i.e. profits he would earn above the normal profits by investing in ventures other than his.

Concept of Cost:

When a firm starts producing goods, it has to pay the price for the factors employed for the production. These factors include wages to workers employed, prices for the raw materials, fuel and power used, rent for the building he hires, and interest on the money borrowed for doing business, etc.

Accounting Costs are these costs which are included in the cost of production. Hence, accounting costs take care of all payments and charges that the firm makes to suppliers of different productive factors.

Usually, a businessman invests some capital in his firm. If he would have invested the amount in some other firm, then he could have earned a certain interest/dividend. Further, he invests time for his business and also contributes his entrepreneurial and managerial ability to the business.

If not involved in the business, he could have offered his services to other firms for an amount of money. Accounting costs DO NOT involve these costs. They form a part of the Economic Costs. Hence, Economic costs include:

- The normal return on the money that the businessman invests in his own business
- The salary not paid to the entrepreneur but could have been earned if the services would have been sold elsewhere.
- A reward for all factors owned by the businessman and used in his own business.

Therefore, the accounting costs involve cash payments that the firm makes. Economic costs, on the other hand, include the accounting costs and also take into account the amount of money the businessman could have earned with his resources if he would not have started the business.

Another name for accounting costs is Explicit Costs. Whereas, the alternate name for the costs of factors that the businessman owns is Implicit Costs. A businessman earns profits when his revenues exceed both explicit and implicit costs.

Cost, a key concept in economics, is the monetary expense incurred ‘by organizations for various purposes, such as acquiring resources, producing goods and services, advertising, and hiring workers. In other words, cost can be defined as monetary expenses that are incurred by an organization for a specified tiling or activity.

According to Institute of Cost and Work Accountants (ICWA), cost implies “measurement in monetary terms of the amount of resources used for the purpose of production of goods or rendering services.” In terms of manufacturing, costs refer to sum total -of monetary value of resources used in producing or manufacturing a product. These resources can be raw material, labor, and land.

A cost comprises a number of elements, which are shown in Figure-1:

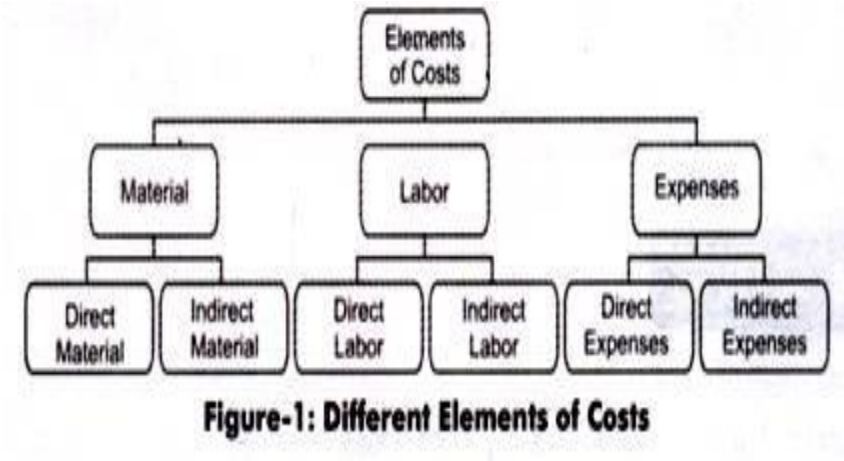


Figure-1: Different Elements of Costs

Cost Function: Concept and Importance

Concept of Cost Function:

The relationship between output and costs is expressed in terms of cost function. By incorporating prices of inputs into the production function, one obtains the cost function since cost function is derived from production function. However, the nature of cost function depends on the time horizon. In microeconomic theory, we deal with short run and long run time.

A cost function may be written as:

$$C_q = f(Q_f P_f)$$

Where C_q is the total production cost, Q_f is the quantities of inputs employed by the firm, and P_f is the prices of relevant inputs. This cost equation says that cost of production depends on prices of inputs and quantities of inputs used by the firm.

Importance of Cost Function:

The study of business behaviour concentrates on the production process—the conversion of inputs into outputs—and the relationship between output and costs of production.

We have already studied a firm's production technology and how inputs are combined to produce output. The production function is just a starting point for the supply decisions of a firm. For any business decision, cost considerations play a great role.

Cost function is a derived function. It is derived from the production function which captures the technology of a firm. The theory of cost is a concern of managerial

economics. Cost analysis helps allocation of resources among various alternatives. In fact, knowledge of cost theory is essential for making decisions relating to price and output.

Whether production of a new product is a wiser one on the part of a firm greatly depends on the evaluation of costs associated with it and the possibility of earning revenue from it. Decisions on capital investment (e.g., new machines) are made by comparing the rate of return from such investment with the opportunity cost of the funds used.

What is Total Cost?

Definition: Total cost is an economic measure that sums all expenses paid to produce a product, purchase an investment, or acquire a piece of equipment including not only the initial cash outlay but also the opportunity cost of their choices.
What Does Total Cost Mean?

What is the definition of total cost?

The meaning of this term varies slightly depending on the content. For example, when using it to define production costs, it measures the total fixed, variable, and overhead expenses associated with producing a good. This is a fundamental concept for business owners and executives because it allows them to track the combined costs of their operations. It allows the individuals to make pricing and revenue decisions based on whether total costs are increasing or decreasing. Furthermore, interested individuals can dig into the total cost numbers to separate them into fixed costs and variable costs, and adjust operations accordingly to lower overall costs of production. Management also uses this idea when contemplating capital expenditures.
Investors, however, use this concept differently by looking at the funds needed to purchase an investment along with the opportunity costs associated with picking one investment over another.

Example
Jane is the Chief Operating Officer of the largest car manufacturer in the world. The company has recently been seeing its total costs increase 15% year over year and Jane has been put in charge of analyzing this trend in an effort to fix it.

She sees that the company's costs, overall, have risen from $100,000 to $132,250 in only two years, which validates the extreme growth in costs. After looking through the numbers, she sees, to her surprise, that fixed costs have not actually increased, but have decreased from $70,000 to $65,000. Additionally, she sees that the firm's variable costs, specifically in salary and benefits, have ballooned from $30,000 to $67,250.

Average Cost

Definition: The **Average Cost** is the per unit cost of production obtained by dividing the total cost (TC) by the total output (Q). By per unit cost of production, we mean that all the fixed and variable cost is taken into the consideration for calculating the average cost. Thus, it is also called as **Per Unit Total Cost**.

Symbolically, the average cost is expressed as:

AC = TC/Q

Also,

AC = Average Variable cost (AVC) + Average Fixed cost (AFC)

Where,

Average variable cost = Total Variable Cost (TVC) / Total output (Q)
Average fixed cost = Total Fixed Cost (TFC) / Total output (Q)

The average cost is greatly influenced by the time period of production, such as increasing or expanding the production in the short run might be quite expensive or impossible. Thus, the economists study both the **short-run average costs** and **long-run average costs** to decide the production for a given period.

The short-run average cost is the cost that varies with the production of goods, provided the fixed costs are zero, and the variable costs are constant. While the long-run average cost includes all the cost involved in the variation of the quantities of all the inputs used for the production. The long-run is the time period wherein the quantities of all the inputs to be used can vary, even capital. Thus, the average cost is an important factor in determining the supply and demand within the market.

Total Cost

Definition: The **Total Cost** is the actual cost incurred in the production of a given level of output. In other words, the total expenses (cost) incurred, both explicit and implicit, on the resources to obtain a certain level of output is called the total cost.

The total cost includes both the **variable cost** (that varies with the change in the total output) and the **fixed cost** (that remains fixed irrespective of the change in the total output). Thus, total cost includes the cost of all the input factors used for producing a certain level of output.

Often, the economists use two-factor inputs in the cost model Viz. Capital (K) and labor (L). The capital is considered to be a fixed cost, i.e. will remain fixed irrespective of the production level and per unit rental price is denoted by ‘r’. Thus the total fixed cost is ‘**Kr’.** While, the labor, denoted ‘L’ is considered as the variable cost, which changes in the proportion to the level of production. The wage rate is denoted by ‘w’ and thus, the total variable cost is ‘**Lw’.** Symbolically,

TC = FC + VC = Kr +Lw

If it is assumed that the unit variable (labor) cost remains constant, then the total cost is linear in volume and can be calculated as:

TC = Fixed Cost + Unit Variable Cost X Amount

Marginal Cost Of Production

What Is the Marginal Cost of Production?

In economics, the marginal cost of production is the change in total production cost that comes from making or producing one additional unit. To calculate marginal cost, divide the change in production costs by the change in quantity. The purpose of analyzing marginal cost is to determine at what point an organization can achieve economies of scale to optimize production and overall operations. If the marginal cost of producing one additional unit is lower than the per-unit price, the producer has the potential to gain a profit.

Understanding Marginal Cost of Production

The marginal cost of production is an economics and managerial accounting concept most often used among manufacturers as a means of isolating an optimum production level. Manufacturers often examine the cost of adding one more unit to their production schedules. At a certain level of production, the benefit of producing one additional unit and generating revenue from that item will bring the overall cost of producing the product line down. The key to optimizing manufacturing costs is to find that point or level as quickly as possible.

Marginal cost of production includes all of the costs that vary with that level of production. For example, if a company needs to build an entirely new factory in order to produce more goods, the cost of building the factory is a marginal cost. The amount of marginal cost varies according to the volume of the good being produced.

Example of Marginal Cost of Production

Production costs consist of both fixed costs and variable costs. Fixed costs do not change with an increase or decrease in production levels, so the same value can be spread out over more units of output with increased production. Variable costs refer to costs that change with varying levels of output. Therefore, variable costs will increase when more units are produced.

For example, consider a hatmaker. Each hat produced requires seventy-five cents of plastic and fabric. Plastic and fabric are variable costs. The hat factory also incurs $1,000 dollars of fixed costs per month. If you make 500 hats per month, then each hat incurs $2 of fixed costs ($1,000 total fixed costs / 500 hats). In this simple example, the total cost per hat would be $2.75 ($2 fixed cost per unit + $.75 variable costs).

If the hatmaker cranked up production volume and produced 1,000 hats per month, then each hat would incur $1 dollar of fixed costs ($1,000 total fixed costs / 1,000 hats),

because fixed costs are spread out over an increased number of units of output. The total cost per hat would then drop to $1.75 ($1 fixed cost per unit + $.75 variable costs). In this situation, increasing production volume causes marginal costs to go down.

If the hat factory was unable to handle any more units of production on the current machinery, the cost of adding an additional machine would need to be included in the marginal cost of production. Assume the machinery could only handle 1,499 units. The 1,500th unit would require purchasing an additional $500 machine. In this case, the cost of the new machine would also need to be considered in the marginal cost of production calculation as well.

Short Run Cost

Definition: The **Short-run Cost** is the cost which has short-term implications in the production process, i.e. these are used over a short range of output. These are the cost incurred once and cannot be used again and again, such as payment of wages, cost of raw materials, etc.

In a short-run, at least one factor of production is fixed while the other remains variable. Therefore, in the short-run, the level of output can be increased only by increasing the variable factors such as labor, raw materials while the other factors such as capital, plant size, remains unchanged. The short-run cost includes both the fixed cost (that do not change with the change in the level of output) and variable cost (that varies with the variations in the level of output). Some factors remain fixed due to the time constraints imposed on a company.

For example, Suppose a company observes a sudden surge in the demand for its goods and in order to meet the increased demand in the short-run, it can increase its level of output only by varying the variable factors. Such as, the company can employ more labor or purchase the raw material in bulk, but however, the plant size or the machinery cannot be altered to enhance the production capacity of the firm. Thus, all the cost incurred on the variable factors such as labor and raw material constitutes the short-run cost.

From an analytical point of view, the short run costs vary with the change in the total output, but however, the size of the firm remains the same. Thus, the short-run cost is treated as a variable cost.

Long Run Cost

Definition: The **Long-run Cost** is the cost having the long-term implications in the production process, i.e. these are spread over the long range of output. These costs are incurred on the fixed factors, Viz. Plant, building, machinery, etc. but however, the running cost and the depreciation on plant and machinery is a variable cost and hence is included in the short-run costs.

The long-run cost is incurred when the firm decides to change its production capacity over time in order to respond to the anticipated economic profits and losses. In short-run, all the factors of production and costs are variable and hence the level of output can be changed by varying all the factors, the even capital.

In the long run, even the fixed cost becomes the variable cost as the size of the firm or scale of production increases. The entrepreneurship, land, labor, capital goods, etc. all vary to attain the desired level of profits in the long run, and the cost of each factor adds to the long-run costs.

The long-run stage is characterized by planning and implementation wherein the producer decides on the level of production and take long-run decisions that affect the overall cost of the firm. The long-run decisions include leaving or entering the market, expanding or contracting the company's operations, changing the quantity of production, etc.

Average Cost

Definition: The **Average Cost** is the per unit cost of production obtained by dividing the total cost (TC) by the total output (Q). By per unit cost of production, we mean that all the fixed and variable cost is taken into the consideration for calculating the average cost. Thus, it is also called as **Per Unit Total Cost**.

Symbolically, the average cost is expressed as:

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Also,

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Where,

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The average cost is greatly influenced by the time period of production, such as increasing or expanding the production in the short run might be quite expensive or impossible. Thus, the economists study both the **short-run average costs** and **long-run average costs** to decide the production for a given period.

The short-run average cost is the cost that varies with the production of goods, provided the fixed costs are zero, and the variable costs are constant. While the long-run average cost includes all the cost involved in the variation of the quantities of all the inputs used for the production. The long-run is the time period wherein the quantities of all the inputs to be used can vary, even capital. Thus, the average cost is an important factor in determining the supply and demand within the market.

The Short-Run Average Cost Curves

However, the cost y concept is more frequently used both by businessmen and economists in the form of cost per unit, or average costs rather than as total costs. We, therefore, pass on to the study of short-run average cost curves.

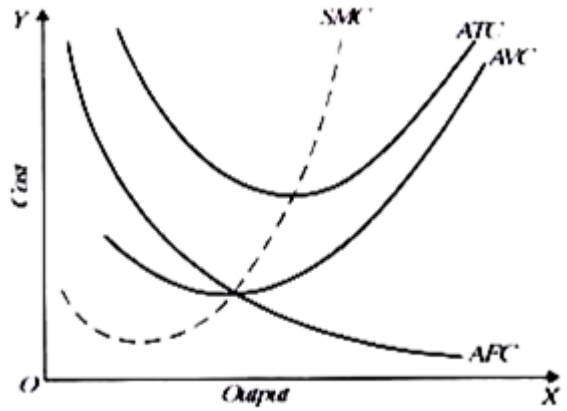


Fig. 19.2. *Short-Run Average and Marginal Cost Curves*

Average Fixed Cost (AFC):

Average fixed cost is the total fixed cost divided by the number of units of output produced. Therefore,

AFC = TFC/Q

Where Q represents the number of units of output produced.

Thus average fixed cost is the fixed cost per unit of output. Suppose for a firm the total fixed cost is Rs. 2,000 when output is 100 units, average fixed cost (AFC) will be Rs. 2,000/100 = Rs. 20 and when output is expanded to 200 units, average fixed cost will be Rs. 2,000/200 = Rs. 10. Since total fixed cost is a constant quantity, average fixed cost will steadily fall as output increases.

Table 19.2. Average Fixed Cost, Average Variable Cost and Average Total Cost:

Units of output (Q)	Total Fixed Cost (TFC)	Total Variable Cost (TVC)	Total Cost (TC)	Average Fixed Cost (AFC)	Average Variable Cost (AVC) TVC/Q	Average Total Cost (ATC) TC/Q
0	50	0	50	0	0	0
1	50	20	70	50.00	20.00	70.00
2	50	35	85	25.00	17.50	42.50
3	50	60	110	16.67	20.00	36.67
4	50	100	150	12.50	25.00	37.50
5	50	145	195	10.00	29.00	39.00
6	50	190	240	8.33	31.67	40.00
7	50	237	287	7.14	33.86	41.00
8	50	284	334	6.25	35.50	41.75

Therefore, average fixed cost curve slopes downward throughout its length. As output increases, the total fixed cost spreads over more and more units and therefore average fixed cost becomes less and less. When output becomes very large, average fixed cost approaches zero.

Consider Table 19.2 where total cost is Rs. 50 when one .unit of output is produced, the average fixed cost is obviously Rs. 50(50/1=50). On raising output to 2 units, average fixed cost will be Rs. 25. (i.e. 50/2 = 25). Further, if output is increased to 8 units, average fixed cost falls to Rs. 6.25 (i.e. 50/8 = 6.25). Average fixed cost curve (AFC) is shown in Fig. 19.2.

It will be seen that average fixed cost curve continuously falls throughout. Mathematically speaking, average fixed cost curve approaches both axes asymptotically. In other words, AFC curve gets very nearer to but never touches either axis.

The average fixed cost curve, AFC, possesses another important property. If we pick up any point on the average fixed cost curve and multiply the average fixed cost at that point with the corresponding quantity of output produced, then the product is always the same. This is because the product of the average fixed cost and the corresponding quantity of output will yield total fixed cost which remains constant throughout. A curve with such a property is called rectangular hyperbola.

Average Variable Cost (AVC):

Average variable cost is the total variable cost divided by the number of units of output produced. Therefore,

AVC = TVC

Where Q represents the total output produced.

Thus average variable cost is variable cost per unit of output. The average variable cost will generally fall as output increases from zero to the normal capacity output due to the occurrence of increasing returns. But beyond the normal capacity output average variable cost will rise steeply because of the operation of diminishing returns.

Thus, in Table 19.2 average variable cost can be obtained from dividing total variable cost (TVC) by output. It will be seen from Table 19.2 that when two units of output are being produced, average variable cost can be found by dividing Rs. 35 by 2 which is equal to Rs. 17.50.

Likewise, when five units of output are being produced, average variable cost becomes Rs. 79. The average variable cost curve is shown in Fig. 19.2 by the curve AVC which first falls, reaches a minimum and then rises.

Average total cost (ATC) is the sum of the average variable cost and average fixed cost. Therefore, as output increases and average fixed cost becomes smaller and smaller, the vertical distance between the average total cost curve (ATC) and average variable cost curve (AVC) goes on declining. When average fixed cost curve (AFC) approaches the X-axis, the average variable cost curve approaches the average total cost curve (ATC).

Relationship between AVC and Average Product:

Average variable cost bears an important relationship with the average product per unit of the variable factor. Let Q stand for quantity of total product produced; L for the amount of the variable factor, say labour, used and w for the price per unit of the variable factor and AP for the average product of the variable factor. We assume that the price of the variable factor remains unaltered as more or fewer units of the variable factor are employed.

Total product (or output Q) = AP x L

Where AP stands for average product of labour, the variable factor and L for the amount of labour used.

Average variable cost (AVC) = TVC/Q

Since the total variable cost (TVC) is equal to the amount of the variable factor (L) employed multiplied by the price per unit (w) of the variable factor, (TVC = L.w.). Therefore

AVC = L.w/Q

Since Q = AP x L

A VC = L.w/AP x L = w/AP = w (1/AP)

Thus, given the price of the variable factor w, the average variable cost is equal to the reciprocal of the average product (1/AP is the reciprocal of AP) multiplied by a constant w. It follows that average variable cost and average product of the variable factor vary inversely with each other.

Therefore, when average product of the variable factor rises in the beginning as more units of the variable factor are employed, the average variable cost must be falling. And when the average product of the variable factor falls, the average variable cost must be rising.

At the level of output at which the average product of the variable factor is maximum the average variable cost is minimum. Thus the average variable cost (AVC) curve looks like the average product (AP) curve turned upside down with minimum point of the AVC curve corresponding to the maximum point of the AP curve.

Average Total Cost (ATC):

The average total cost or what is simply called average cost is the total cost divided by the number of units of output produced.

Average total cost = Total Cost/Output

or ATC = TC/Q

Since the total cost is the sum of total variable cost and the total fixed cost, the average total cost is also the sum of average variable cost and average fixed cost.

This can be proved as follows:
ATC = TC/Q

Since TC = TVC + TFC

Therefore, ATC = TVC + TFC/Q

= TVC/Q + TFC/Q

= AVC + AFC

Average total cost is also known as unit cost, since it is cost per unit of output produced. As the average total cost is the sum of average variable cost and average fixed cost, in Table 19.2 it can be obtained by summing up the figures of columns 5 and 6 corresponding to different levels of output.

Thus, for example, with two units of output, average total cost is Rs. 25 + Rs. 17.50 = Rs. 42.50 and with three units of output it is equal to Rs. 16.67 + Rs. 20 = Rs. 36.67 and so on for other levels of output.

Alternatively, the average total cost can be obtained directly from dividing the total cost by the number of units of output produced. Thus average total cost of 2 units of output is equal to Rs. 85/2 or Rs. 42.50. Likewise, when output is raised to 6 units, total cost rises to 240 and average total cost works out to be Rs. 240/6 = Rs. 40.

It follows from above that the behaviour of the average total cost curve will depend upon the behaviour of the average variable cost curve and average fixed cost curve. In the beginning, both AVC and AFC curves fall, the ATC curve therefore falls sharply in the beginning.

When AVC curve begins rising, but AFC curve is falling steeply, the ATC curve continues to fall. This is because during this stage the fall in AFC curve weighs more than the rise in the AVC curve. But as output increases further, there is a sharp rise in AVC which more than offsets the fall in AFC.

Therefore the A TC curve rises after a point. Thus, the average total cost curve (ATC) like the A VC curve first falls, reaches its minimum value and then rises. The average total cost curve (ATC) is therefore almost of a 'U' shape.

Long Run Cost and It's Types

In the long run, all the factors of production used by an organization vary. The existing size of the plant or building can be increased in case of long run.

There are no fixed inputs or costs in the long run. Long run is a period in which all the costs change as all the factors of production are variable.

There is no distinction between the Long run Total Costs (LTC) and long run variable cost as there are no fixed costs. It should be noted that the ability of an organization of changing inputs enables it to produce at lower cost in the long run.

1. Long Run Total Cost:

Long run Total Cost (LTC) refers to the minimum cost at which given level of output can be produced. According to Leibhafasky, "the long run total cost of production is the least possible cost of producing any given level of output when all inputs are variable." LTC represents the least cost of different quantities of output. LTC is always less than or equal to short run total cost, but it is never more than short run cost.

The LTC curve is shown in Figure-10:

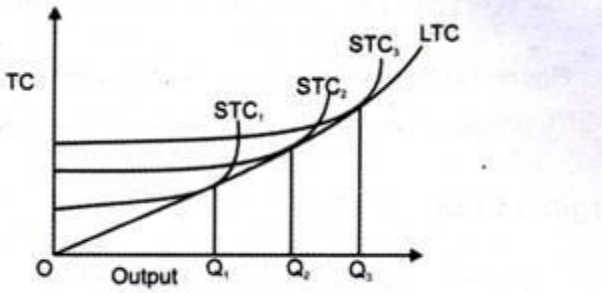


Figure-10: LTC Curve

As shown in Figure-10, short run total costs curves; STC1, STC2, and STC3 are shown depicting different plant sizes. The LTC curve is made by joining the minimum points of short run total cost curves. Therefore, LTC envelopes the STC curves.

2. Long Run Average Cost:

Long run Average Cost (LAC) is equal to long run total costs divided by the level of output. The derivation of long run average costs is done from the short run average cost curves. In the short run, plant is fixed and each short run curve corresponds to a particular plant. The long run average costs curve is also called planning curve or envelope curve as it helps in making organizational plans for expanding production and achieving minimum cost.

Figure-11 shows the derivation of LAC curve:

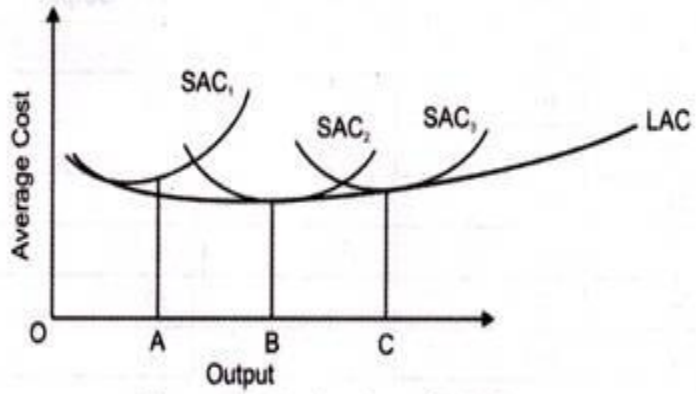


Figure-11: Derivation of LAC Curve

Suppose there are three sizes of the plant and no other size of the plant can be built. In short run, the plant sizes are fixed thus, organization increase or decrease the variable factors. However, in the long run, the organization can select among the plants which help in achieving minimum possible cost at a given level of output.

From Figure-11, it can be noted that till OB amount of production, it is beneficial for the organization to operate on the plant SAC^2 as it entails lower costs than SAC^1. If the plant SAC^2 is used for producing OA, then cost incurred would be more. Thus, in the long run, it is clear that the producer would produce till OB on plant SAC^2. On SAC^2, the producer would produce till OC amount of output. If an organization wants to exceed output from OC, it will be beneficial to produce at SAC^3 than SAC^2.
Thus, in the long run, an organization has a choice to use the plant incurring minimum costs at a given output. LAC depicts the lowest possible average cost for producing different levels of output. The LAC curve is derived from joining the lowest minimum costs of the short run average cost curves.

It first falls and then rises, thus it is U- shaped curve. The returns to scale also affect the LTC and LAC. Returns to scale implies a change in output of an organization with a change in inputs. In the long run, the output changes with respect to change in all inputs of production.

In case of increasing returns to scale (IRS), organizations can double the output by using less than twice of inputs. LTC increases less than the increase in the output, thus, LAC falls. In case of constant returns to scale (CRS), organizations can double the output by using inputs twice.

LTC increases proportionately to the output; therefore, LAC becomes constant. On the other hand, in case of decreasing returns to scale (DRS), organizations can double the output by using inputs more than twice. Thus, LTC increases more than the increase in output. As a result, LAC increases.

Figure-12 shows the effect on LAC because of returns to scale:

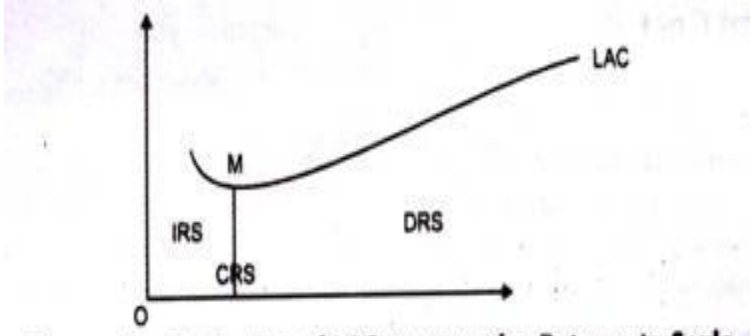


Figure-12: Derivation of LAC curve under Returns to Scale

As shown in Figure-12, up to M, LAC slopes downward. This is because at this stage IRS is applied. On the other hand, at M, LAC becomes constant. After M, LAC slopes upwards implying DRS.

3. Long Run Marginal Cost:

Long run Marginal Cost (LMC) is defined as added cost of producing an additional unit of a commodity when all inputs are variable. This cost is derived from short run marginal cost. On the graph, the LMC is derived from the points of tangency between LAC and SAC.

LMC curve can be learned through Figure-13:

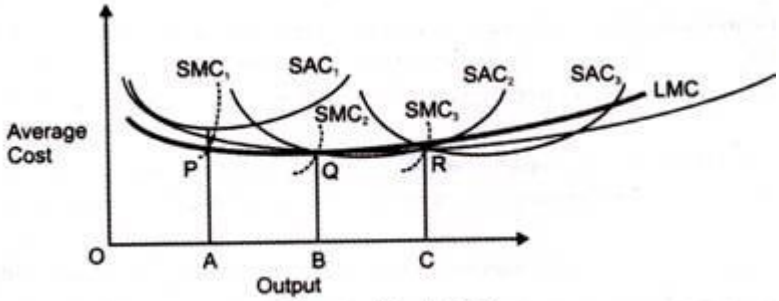


Figure-13: LMC Curve

If perpendiculars are drawn from point A, B, and C, respectively; then they would intersect SMC curves at P, Q, and R respectively. By joining P, Q, and R, the LMC curve would be drawn. It should be noted that LMC equals to SMC, when LMC is tangent to the LAC.

In Figure-13, OB is the output at which:

$SAC_2 = SMC_2 = LAC = LMC$

We can also draw the relation between LMC and LAC as follows:

When LMC < LAC, LAC falls

When LMC = LAC, LAC is constant

When LMC > LAC, LAC rises

Long Run Cost Curves

The long run is different from the short run in the variability of factor inputs. Accordingly, long-run cost curves are different from short-run cost curves. This lesson introduces you to Long run Total, Marginal and Average costs. You will learn the concepts, derivation of cost curves and graphical representation by way of diagrams and solved examples.

The Concept of the Long Run

The long run refers to that time period for a firm where it can vary all the factors of production. Thus, the long run consists of variable inputs only, and the concept of fixed inputs does not arise. The firm can increase the size of the plant in the long run. Thus, you can well imagine no difference between long-run variable cost and long-run total cost, since fixed costs do not exist in the long run.

Long Run Total Costs

Long run total cost refers to the minimum cost of production. It is the least cost of producing a given level of output. Thus, it can be less than or equal to the short run average costs at different levels of output but never greater.

In graphically deriving the LTC curve, the minimum points of the STC curves at different levels of output are joined. The locus of all these points gives us the LTC curve.

Long Run Average Cost Curve

Long run average cost (LAC) can be defined as the average of the LTC curve or the cost per unit of output in the long run. It can be calculated by the division of LTC by the quantity of output. Graphically, LAC can be derived from the Short run Average Cost (SAC) curves.

While the SAC curves correspond to a particular plant since the *plant is fixed in the short-run*, the LAC curve depicts the scope for expansion of plant by minimizing cost.

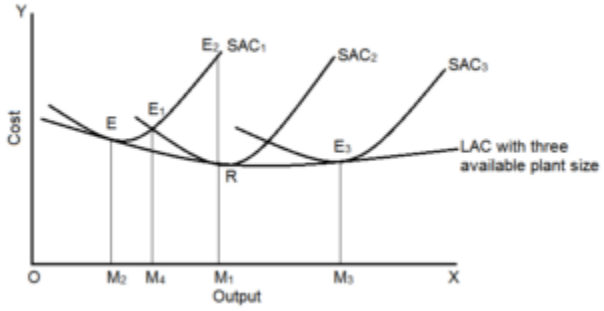
Derivation of the LAC Curve

Note in the figure, that each SAC curve corresponds to a particular plant size. This size is fixed but what can vary is the variable input in the short-run. In the long run, the firm will select that plant size which can minimize costs for a given level of output.

You can see that till the OM_1 level of output it is logical for the firm to operate at the plat size represented by SAC_2. If the firm operates at the cost represented by SAC_2 when producing an output level OM_2, the cost would be more.

So in the long run, the firm will produce till OM_1 on SAC_2. However, till an output level represented by OM_3, the firm can produce at SAC_2, after which it is profitable to produce at SAC_3 if the firm wishes to minimize costs.

Figure 1



Thus, the choice, in the long run, is to produce at that plant size that can minimize costs. Graphically, this gives us a LAC curve that joins the minimum points of all possible SAC curves, as shown in the figure. Thus, the LAC curve is also called an *envelope curve or planning curve*. The curve first falls, reaches a minimum and then rises, giving it a U-shape.

We can use *returns to scale* to explain the shape of the LAC curve. Returns to scale depict the change in output with respect to a change in inputs. During *Increasing Returns to Scale* (IRS), the output doubles by using less than double inputs. As a result, LTC increases less than the rise in output and LAC will fall.

- In *Constant Returns to Scale* (CRS), the output doubles by doubling the inputs and the LTC increases proportionately with the rise in output. Thus, LAC remains constant.
- In *Decreasing Returns to Scale* (DRS), the output doubles by using more than double the inputs so the LTC increases more than proportionately to the rise in output. Thus, LAC also rises. This gives LAC its U-shape.

Long Run Marginal Cost

Long run marginal cost is defined at the additional cost of producing an extra unit of the output in the long-run i.e. when all inputs are variable. The LMC curve is derived by the points of tangency between LAC and SAC.

Note an important relation between LMC and SAC here. When LMC lies below LAC, LAC is falling, while when LMC is above LAC, LAC is rising. At the point where LMC = LAC, LAC is constant and minimum.

Solved Example

Question: Why is the LAC also called the envelope curve?

Answer: The LAC curve suggests the long run optimization problem of the firm. The firm can choose a plant size to operate at in the long-run where all inputs are variable. Thus, the firm shall choose that plant at which it can minimize costs.

So, the LAC is derived by joining the minimum most points of all possible SAC curves of the firm at different output levels. Since the LAC thus obtained almost 'envelopes' the SAC curves faced by the firm, it is called the envelope curve.

Economies and Diseconomies of Scale

Economies of scale are defined as the cost advantages that an organization can achieve by expanding its production in the long run.

In other words, these are the advantages of large scale production of the organization. The cost advantages are achieved in the form of lower average costs per unit.

It is a long term concept. Economies of scale are achieved when there is an increase in the sales of an organization. As a result, the savings of the organization increases, which further enables the organization to obtain raw materials in bulk. This helps the organization to enjoy discounts. These benefits are called as economies of scale.

The economies of scale are divided in to internal economies and external economies discussed as follows:

i. Internal Economies:

Refer to real economies which arise from the expansion of the plant size of the organization. These economies arise from the growth of the organization itself.

The examples of internal economies of scale are as follows:

a. Technical economies of scale:

Occur when organizations invest in the expensive and advanced technology. This helps in lowering and controlling the costs of production of organizations. These economies are enjoyed because of the technical efficiency gained by the organizations. The advanced technology enables an organization to produce a large number of goods in short time. Thus, production costs per unit falls leading to economies of scale.

b. Marketing economies of scale:

Occur when large organizations spread their marketing budget over the large output. The marketing economies of scale are achieved in case of bulk buying, branding, and advertising. For instance, large organizations enjoy benefits on advertising costs as they cover larger audience. On the other hand, small organizations pay equal advertising expenses as large organizations, but do not enjoy such benefits on advertising costs.

c. Financial economies of scale:

Take place when large organizations borrow money at lower rate of interest. These organizations have good credibility in the market. Generally, banks prefer to grant loans to those organizations that have strong foothold in the market and have good repaying capacity.

d. Managerial economies of scale:

Occur when large organizations employ specialized workers for performing different tasks. These workers are experts in their fields and use their knowledge and experience to maximize the profits of the organization. For instance, in an organization, accounts and research department are created and managed by experienced individuals, SO that all costs and profits of the organization can be estimated properly.

e. Commercial economies:

Refer to economies in which organizations enjoy benefits of buying raw materials and selling of finished goods at lower cost. Large organizations buy raw materials in bulk; therefore, enjoy benefits in transportation charges, easy credit from banks, and prompt delivery of products to customers.

ii. External economies:

Occur outside the organization. These economies occur within the industries which benefit organizations. When an industry expands, organizations may benefit from better transportation network, infrastructure, and other facilities. This helps in decreasing the cost of an organization.

Some of the examples of external economies of scale are discussed as follows:

a. Economies of Concentration:

Refer to economies that arise from the availability of skilled labor, better credit, and transportation facilities.

b. Economies of Information:

Imply advantages that are derived from publication related to trade and business. The central research institutions are the source of information for organizations.

c. Economies of Disintegration:

Refer to the economies that arise when organizations split their processes into different processes.

Diseconomies of scale occur when the long run average costs of the organization increases. It may happen when an organization grows excessively large. In other words, the diseconomies of scale cause larger organizations to produce goods and services at increased costs.

There are two types of diseconomies of scale, namely, internal diseconomies and external diseconomies, discussed as follows:

i. Internal diseconomies of scale:

Refer to diseconomies that raise the cost of production of an organization. The main factors that influence the cost of production of an organization include the lack of decision, supervision, and technical difficulties.

ii. External diseconomies of scale:

Refer to diseconomies that limit the expansion of an organization or industry. The factors that act as restraint to expansion include increased cost of production, scarcity of raw materials, and low supply of skilled laborer.

There are a number of causes for diseconomies of scale.

Some of the causes which lead to diseconomies of scale are as follows:

i. Poor Communication:

Act as a major reason for diseconomies of scale. If production goals and objectives of an organization are not properly communicated to employees within the organization, it may lead to overproduction or production. This may lead to diseconomies of scale.

Apart from this, if the communication process of the organization is not strong then the employees would not get adequate feedback. As a result, there would be less face-to-face interaction among employees- thus the production process would be affected.

ii. Lack of Motivation:

Leads to fall in productivity levels. In case of a large organization, workers may feel isolated and are less appreciated for their work, thus their motivation diminishes. Due to poor communication network, it is harder for employers to interact with the employees and build a sense of belongingness. This leads to fall in the productivity levels of output owing to lack of motivation. This further leads to increase in costs of the organization.

iii. Loss of Control:

Acts as the main problem of large organizations. Monitoring and controlling the work of every employee in a large organization becomes impossible and costly. It is harder to make out that all the employees of an organization are working towards the same goal. It becomes difficult for managers to supervise the sub-ordinates in large organizations.

iv. Cannibalization:

Implies a situation when an organization faces competition from its own product. A small organization faces competition from products of other organizations, whereas sometimes large organizations find that their own products are competing with each other.