MANAGERIAL ECONOMICS MODULE I

INTRODUCTION

Managerial economics is a combination of economics and management.

Economy is the system of production, distribution and consumption of goods and services that a society used to tackle the problem of scarcity of resources.

Economics refers to the condition under which goods are produces in a society and the way the people are gainfully employed.

Managerial economics is also called Business Economics. Currently, the term managerial economics has become more popular and seems to displace progressively the term business economics.

One of the major functions of management in a business organization is decision making and forward planning. Decision making is selecting one action from the available alternatives. Forward planning is to forecast the future developments in the economy and formulate plans for production and distribution of goods and services.

Decision making and selecting one option from the available alternatives arises, as factors of production, land, labor, capital and organization, are limited and can be employed in alternative uses and can be substituted for one another to some extent.

The decision-making function, thus, is useful in finalizing an optimal solution in attaining the desired goal. The desired goal may be the maximization of profit. The decision is made, regarding production, pricing, capital, raw materials, labor, etc., depending on the objective to be achieved. Thus, forward planning and decision making go hand in hand.

Microeconomics The study of an individual consumer or a firm is called microeconomics (also called the Theory of Firm). Micro means 'one millionth'. Microeconomics deals with behavior and problems of single individual and of micro organization. Managerial economics has its roots in microeconomics and it deals with the micro or individual enterprises. It is concerned with the application of the concepts such as price theory, Law of Demand and theories of market structure and so on.

Macroeconomics The study of 'aggregate' or total level of economics activity in a country is called macroeconomics. It studies the flow of economics resources or factors of production (such as land, labour, capital, organization and technology) from the resource owner to the business firms and then from the business firms to

the households. It deals with total aggregates, for instance, total national income total employment, output and total investment. It studies the interrelations among various aggregates and examines their nature and behaviour, their determination and causes of fluctuations in the. It deals with the price level in general, instead of studying the prices of individual commodities. It is concerned with the level of employment in the economy. It discusses aggregate consumption, aggregate investment, price level, and payment, theories of employment, and so on

Definition

Managerial economics is economics applied in decision making. It is a special branch of economics bridging the gap between abstract theory and managerial practice. Managerial economics is concerned with choice. It deals with selection of one best alternative among the several alternatives available. According to McNair and Merriam, "managerial economics consists of the use of economic modes of thought to analyze business situations."

Spencer and Seligman have defined managerial economics as the integration of economic theory with business practice for the purpose of facilitating decision making and forward planning by management. As the definitions explain, managerial economics is the discipline which deals with the application of economic theory to business management.

Nature of Managerial Economics

It would be useful to point out certain chief characteristics of managerial economics, as they throw further light on the nature and the subject-matter, which help in a clearer understanding the subject.

- Managerial economics is micro-economic in character. This is because the unit of study is a firm; it is the problems of a business firm which are studied in it. Managerial economics does not deal with the entire economy as a unit of study.
- Managerial economics largely uses that body of economics concepts and principles which are useful for the firm. Hence, managerial economics is also known as theory of the firm. In addition, it also talks about profit maximization, which is part of distribution theory in economics.

- Managerial economics is realistic. It avoids difficult abstract issues of economic theory. It takes in to consideration the important elements which are useful in decision making.
- Managerial economics is normative in nature, rather than positive. Managerial economics is also described as normative micro-economics of the firm. In other words, it is prescriptive rather than descriptive, unlike Economics. Economic theory, on the other hand, is both positive and normative.Economics is concerned with what decisions ought to be made and involves value judgments. Economics talks about the aims and objectives of a firm and tells how best to achieve these aims in different situations. Hence, it is both prescriptive and descriptive.
- Macro-economics is also useful to managerial economics since it provides an intelligent understanding of the environment in which the business must operate, this understanding enables a business executive to adjust in the best possible manner with external forces over which he has no control.

Scope of Managerial Economics:

The scope of managerial economics refers to its area of study. Managerial economics refers to its area of study. Managerial economics, Provides management with a strategic planning tool that can be used to get a clear perspective of the way the business world works and what can be done to maintain profitability in an everchanging environment.

- 1. **Demand Analyses and Forecasting:** A firm can survive only if it is able to the demand for its product at the right time, within the right quantity. Understanding the basic concepts of demand is essential for demand forecasting. Demand analysis should be a basic activity of the firm because many of the other activities of the firms depend upon the outcome of the demand forecast.
- 2. **Pricing and competitive strategy:** Pricing decisions have been always within the preview of managerial economics. Pricing policies are merely a subset of broader class of managerial economic problems. Price theory helps to explain how prices are determined under different types of market conditions. Competitions analysis includes the anticipation of the response

of competitions the firm's pricing, advertising and marketing strategies. Product line pricing and price forecasting occupy an important place here.

- 3. **Production and cost analysis:** Production analysis is in physical terms. While the cost analysis is in monetary terms cost concepts and classifications, cost-out-put relationships, economies and diseconomies of scale and production functions are some of the points constituting cost and production analysis.
- 4. **Resource Allocation:** Managerial Economics is the traditional economic theory that is concerned with the problem of optimum allocation of scarce resources. Marginal analysis is applied to the problem of determining the level of output, which maximizes profit. In this respect linear programming techniques has been used to solve optimization problems. In fact lines programming is one of the most practical and powerful managerial decision making tools currently available.
- 5. **Profit analysis:** Profit making is the major goal of firms. There are several constraints here an account of competition from other products, changing input prices and changing business environment hence in spite of careful planning, there is always certain risk involved. Managerial economicsdeals with techniques of averting of minimizing risks. Profit theory guides in the measurement and management of profit, in calculating the pure return on capital, besides future profit planning.
- 6. **Capital or investment analyses:** Capital is the foundation of business. Lack of capital may result in small size of operations. Availability of capital from various sources like equity capital, institutional finance etc. may help to undertake large-scale operations. Hence efficient allocation and management of capital is one of the most important tasks of the managers. The major issues related to capital analysis are:
 - The choice of investment project
 - Evaluation of the efficiency of capital
 - Most efficient allocation of capital Knowledge of capital theory can help very much in taking investment decisions. This

involves, capital budgeting, feasibility studies, analysis of cost of capital etc.

7. **Strategic planning:** Strategic planning provides management with a framework on which long-term decisions can be made which has an impact on the behavior of the firm. The firm sets certain long-term goals and objectives and selects the strategies to achieve the same. Strategic planning is now a new addition to the scope of managerial economics with the emergence of multinational corporations. The perspective of strategic planning is global.

DEMAND ANALYSIS

It must be remembered that demand in Economics is always stated with reference to a particular price. Any change in price will normally bring about a change in the quantity demanded. In addition to price, demand is also used in reference to a particular period of time. For Example- demand for umbrellas will not be as high in winter as during rains. The demand for any commodity or service, therefore, must be stated with reference to the price and the relevant point of time.

The demand arises out of the following things:

- i. Desire or want of the commodity.
- ii. Ability to pay.
- iii. Willingness to pay.
- iv. At right price
- v. At right time

Only when all these three things are present then the consumer presents his demand in the market.

Definitions:

"Demand for a commodity is the quantity which a consumer is willing to buy at a particular price at a particular time."

"The demand for anything, at a given price, is the amount of it which will be bought per unit of time at that price." -PROF. BENHAM

"By demand, we mean the quantity of a commodity that will be purchased at a particular price and not merely the desire of a thing."-HANSEN

Types of Demand

- 1. Price demand: Price Demand is a demand for different quantities of a product or service that consumers intend to purchase at a given price and time period assuming other factors, such as prices of the related goods, level of income of consumers, and consumer preferences, remain unchanged. Price demand is inversely proportional to the price of a product or service. As the price of a product or service rises, its demand falls and vice versa. Therefore, price demand indicates the functional relationship between the price of a product or service and the quantity demanded.
- 2. Income demand: Income demand is a demand for different quantities of a commodity or service that consumers intend to purchase at different levels of income assuming other factors remain the same. Generally, the demand for a commodity or service increases with an increase in the level of income of individuals except for inferior goods. Therefore, demand and income are directly proportional to normal goods whereas the demand and income are inversely proportional to inferior goods.
- **3. Cross demand:** Cross demand refers to the demand for different quantities of a commodity or service whose demand depends not only on its own price but also the price of other related commodities or services.

For example, tea and coffee are considered to be the substitutes of each other. Thus, when the price of coffee increases, people switch to tea. Consequently, the demand for tea increases. Thus, it can be said that tea and coffee have cross demand.

4. Individual demand and Market demand: This is the classification of demand based on the number of consumers in the market. In dividual

demand refers to the quantity of a commodity or service demanded by an individual consumer at a given price at a given time period.

For example, the quantity of sugar that an individual or household purchases in a month is the individual or household demand. The individual demand of a product is influenced by the price of a product, income of customers, and their tastes and preferences. On the other hand, Market demand is the aggregate of individual demands of all the consumers of a product over a period of time at a specific price while other factors are constant.

For example, there are four consumers of sugar (having a certain price). These four consumers consume 30 kilograms, 40 kilograms, 50 kilograms, and 60 kilograms of sugar respectively in a month. Thus, the market demand for sugar is 180 kilograms in a month.

5. Joint demand: Joint demand is the quantity demanded for two or more commodities or services that are used jointly and are, thus demanded together.

For example, car and petrol, bread and butter, pen and refill, etc. are commodities that are used jointly and are demanded together. The demand for such commodities changes proportionately. For example, a rise in the demand for cars results in a proportionate rise in the demand for petrol.

However, in the case of joint demand, rise in the price of one commodity results in the fall of demand for the other commodity. In the above example, an increase in the price of cars will cause a fall in the demand of not only of cars but also of petrol.

6. Composite demand: Composite Demand is the demand for commodities or services that have multiple uses. For example, the demand for steel is a result of its use for various purposes like making utensils, car bodies, pipes, cans, etc.In the case of a commodity or service having composite demand, a change in price results in a large change in the demand. This is because the demand for the commodity or service would change across its various usages. In the above example, if the price of steel increases, the price of other products made of steel also increases. In such a case, people may restrict their consumption of products made of steel.

7. Direct and Derived demand: Direct demand is the demand for commodities or services meant for final consumption. This demand arises out of the natural desire of an individual to consume a particular product.

For example, the demand for food, shelter, clothes, and vehicles is direct demand as it arises out of the biological, physical, and other personal needs of consumers.

Derived demand refers to the demand for a product that arises due to the demand for other products. For example, the demand for cotton to produce cotton fabrics is derived demand. Derived demand is applicable to manufacturers' goods, such as raw materials, intermediate goods, or machines and equipment. Apart from this, the factors of production (land, labour, capital, and enterprise) also have a derived demand. For example, the demand for labour in the construction of buildings is a derived demand.

Law of Demand

The law of demand represents a functional relationship between the price and quantity demanded of a commodity or service.

The law states that the quantity demanded of a commodity increase with a fall in the price of the commodity and vice versa while other factors like consumers' preferences, level of income, population size, etc. are constant.

Demand is a dependent variable, while the price is an independent variable. Therefore, demand is a function of price and can be expressed as follows:

D=f(P)

Where, D= Demand P= Price f = Functional Relationship

Assumptions of the law

- 1. There is no change in income of consumers.
- 2. There is no change in the price of product.
- 3. There is no change in quality of product.
- 4. There is no substitute of the commodity.
- 5. The prices of related commodities remain the same.
- 6. There is no change in customs.
- 7. There is no change in taste and preference of consumers.
- 8. The size of population remains the same.
- 9. The climate and weather conditions are same.
- 10. The tax rates and other fiscal measures remain the same.

Explanation of the law

The relationship between price of a commodity and its demand depends upon many factors. The most important factor is nature of commodity. The demand schedule shows response of quantity demanded to change in price of that commodity. This is the table that shows prices per unit of commodity ands amount demanded per period of time. The demand of one person is called individual demand. The demand of many persons is known as market demand. The experts are concerned with market demand schedule. The market demand schedule means 'quantities of given commodity which all consumers want to buy at all possible prices at a given moment of time'. The demand schedules of all individuals can be added up to find out market demand schedule.

Demand schedule:

A table showing the quantities of a good that a consumer is willing and able to buy at the prevailing price in a given time period. (Table -1)

Table 3. Demand Schedule	
Price (Rs)	Quantity Demanded
5	100 Units
4	200 Units
3	300 Units
2	400 Units
1 -	600 Units

Demand Curve: A curve indicating the total quantity of a product that all consumers are willing and able to purchase at the prevailing price level, holding the prices of related goods, income and other variables as constant. A demand curve is a graphical representation of a demand schedule. The price is quoted in the 'Y' axis and the quantity demanded over time at different price levels is quoted in 'X' axis. Each point on the curve refers to a specific quantity that will be demanded at a given price.



The above table shows that when the price of say, orange, is Rs. 5 per unit, 100 units are demanded. If the price falls to Rs.4, the demand increases to 200 units. Similarly, when the price declines to Re.1, the demand increases to 600 units. On the contrary, as the price increases from Re. 1, the demand continues to decline from 600 units.

In the figure, point P of the demand curve DD1 shows demand for 100 units at the Rs. 5. As the price falls to Rs. 4, Rs. 3, Rs. 2 and Re. 1, the demand rises to 200, 300, 400 and 600 units respectively. This is clear from points Q, R, S, and T. Thus, the demand curve DD1 shows increase in demand of orange when its price falls. This indicates the inverse relation between price and demand.

Exceptions to the law

1. Inferior goods: The law of demand does not apply in case of inferior goods. When price of inferior commodity decreases and its demand also decrease and amount so saved in spent on superior commodity. The wheat and rice are superior food grains while maize is inferior food grain.

- 2. Demonstration effect: The law of demand does not apply in case of diamond and jewelry. There is more demand when prices are high. There is less demand due to low prices. The rich people like to demonstrate such items that only they have such commodities.
- **3. Ignorance of consumers:** The consumer usually judge the quality of a commodity from its price. A low priced commodity is considered as inferior and less quantity is purchased. A high priced commodity is treated as superior and more quantity is purchased. The law of demand does not apply in this case.
- **4. Less supply:** The law of demand does not work when there is less supply of commodity. The people buy more for stock purpose even at high price. They think that commodity will become short.
- **5. Depression:** The law of demand does not work during period of depression. The prices of commodities are low but there is decrease in demand. it is due to low purchasing power of people.
- **6. Speculation:** The law does not apply in case of speculation. The speculators start buying share just to raise the price. Then they start selling large quantity of shares to avoid losses.
- **7. Out of fashion:** The law of demand is not applicable in case of goods out of fashion. The decrease in prices cannot raise the demand of such goods. The quantity purchased is less even though there is falls in prices.

Importance of the law

- **Price determination:** A monopolist can determine price of a commodity on the basis of such law. He can know the effect on demand due to increase or decrease in price. The demand schedule can help him to determine the most suitable price level.
- **Tax on commodities:** The law of demand is important for tax authorities. The effect of tax on different commodities is checked. The commodity must be taxed if its demand is relatively inelastic. A commodity cannot be taxed if its sales fall to great extent.

- **Agricultural prices:** The law of demand is useful to determine agricultural prices. When there are good crops, the prices come down due to change in demand. In case of bad crops, the prices go up if demand remains the same. The poverty of farmers can be determined.
- **Planning:** Individual demand schedule is used in planning for individual goods and industries. There is need to know the effect of change in price on the demand of commodity at national and world level. The nature of demand schedule helps to know such effect

Concept of Elasticity of Demand:

The law of demand indicates the direction of change in quantity demanded to a change in price. It states that when price falls, demand rises. But how much the quantity demanded rises (or falls) following a certain fall (or rise) in prices cannot be known from the law of demand. That is to say, how much quantity demanded changes following a change in the price of a commodity can be known from the concept of elasticity of demand.

In Fig. 2.41, we have drawn two demand curves for good X and good Y. Both these curves are negative sloping. Let us assume that prices of both goods X and Y are P_{X1} and P_{Y1} (note that $P_{X1} = P_{Y1}$). At price OP_{X1} , a consumer demands OX_1 and, at price OP_{Y1} , OY_1 is demanded.



Fig. 2.41: Responsiveness of Product Demand

Now if prices of both X and Y decline by an identical amount to OP_{X2} and OP_{Y2} , quantity demanded for X and Y rises from OX_1 to OX_2 and from OY_1 to OY_2 , respectively. But the change in quantity demanded for good X is greater than the change in quantity demanded for good Y. This means that good X is more sensitive or responsive to a change in its price than good Y. This is called elasticity of demand.

By elasticity of demand, we normally mean price elasticity of demand. (Price) elasticity of demand measures the degree of responsiveness of quantity demanded following a change in own price of the commodity, holding money income and prices of related goods constant.

(Price) elasticity of demand is the relative difference in the dependent variable (here, quantity) divided by the relative difference in independent variable (here, price). Alternatively, it is defined as the absolute value of the ratio of percentage change in price. Thus, the elasticity of demand is a relative concept.

The formula for calculating elasticity of demand is:

 E_P = proportional changes in quantity demanded/proportional changes in price = % changes in quantity demanded/changes in price

 $E_P = |\Delta Q/Q/\Delta P/P| = |\Delta Q/\Delta P.P/Q|$

The vertical lines in the formula denote that we take the absolute value of the ratio and ΔP and ΔQ denote the changes in price and quantity. Since both price and quantity move in opposite direction, E_P must always be a negative number.

TYPES OF ELASTICITY OF DEMAND

I. Price Elasticity Of Demand

For all types of commodities, the rate of change of quantity demanded to a change in own price is not uniform. For some commodities, demand is said to be more responsive to price changes compared to other commodities. That is why there are various types of elasticity of demand.

They are of the following five types:

(1) Relative Elastic Demand $(E_P > 1)$:

Demand is said to be elastic if the change in price causes a more than proportionate change in quantity demanded. A 10 p.c. change in price causes quantity demanded to change by more than 10 p.c. In other words, if E is greater than one, demand is said to be elastic (Fig. 2.42).



Normally, demand is elastic for luxury goods. Let the price of gold per gm decline from Rs. 160 to Rs. 140. As a result, demand for gold rises from 1,000 kilograms to 2,000 kilograms. Thus,

VISHAKHA MANKAR

Shantiniketan Business School, Nagpur

 $E_P = 1,000/1,000 \div 20/160 = 1,000/20 \ .160/1,000 = 8$ Since elasticity of demand for gold is greater than one, gold is a luxury item.

(2) Relative Inelastic Demand ($E_P < 1$):

When the change in price causes a less than proportionate change in quantity demanded, demand is inelastic. A 10 p.c. cut in price may cause quantity demanded to fall by, say, 1 p.c. Thus, demand is said to be inelastic (E_p < 1), shown in Fig. 2.43. Usually, demand is inelastic for necessary goods.



Fig. 2.43: Inelastic Demand

Suppose that following a drop in the price of wheat from paisa 40 per kilogram to paisa 20 per +kilogram, demand for wheat rises from 1,600 kilograms to 2,000 kilograms. This means

 $E_P = 400/160 \div 20/40 = 400/20.\ 40/1,600 = 0.5$

Thus, wheat has an inelastic demand since $E_P < 1$ and wheat is a necessary article.

(3) Unit elasticity of Demand ($E_P = 1$):

When the change in price causes the same proportionate change in quantity demanded, demand has unit elasticity. A 10 p.c. decline in price will lead to an exactly 10 p.c. increase in quantity demanded. Then $E_P = 1$ (Fig. 2.44).



Fig. 2.44: Unitary Elastic Demand

Suppose that the price of a commodity declines from Rs. 200 to Rs. 100 per kilogram. As a result, demand for that commodity rises from 400 kilograms to 800 kilograms. Thus,

 $E_P = 400/400 \div 100/100 = 400/100. \ 100/400 = 1$

(4) Perfectly Elastic Demand (EP = ∞)

When a slight change in price causes a great change in quantity demanded, the value of elasticity of demand tends to be infinity and demand is said to be infinite or perfectly elastic. In this case, the demand curve (DD,) becomes parallel to the horizontal axis (Fig. 2.45). Under perfectly competitive market, the demand curve for a product of an individual firm becomes perfectly elastic.



Fig. 2.45: Perfectly Elastic Demand

(5) Perfectly Inelastic Demand ($E_P = 0$):

If quantity demanded becomes completely unresponsive to price changes, the coefficient tends to be zero. In this case, whatever the price, even if it is zero, quantity demanded will remain fixed at a particular level. The demand curve, thus, becomes parallel to the vertical axis (Fig. 2.46) and demand is said to be completely (perfectly) inelastic.



Fig. 2.46: Perfectly Inelastic Demand

Thus, elasticity of demand varies from zero to infinity.

II. Income Elasticity of Demand

Income elasticity of demand is the degree of responsiveness of quantity demanded of a commodity due to change in consumer's income, other things remaining constant. In other words, it measures by how much the quantity demanded changes with respect to the change in income

Mathematically, it is expressed as:

Income elasticity of demand= <u>%change in quantity demanded</u> <u>%change in income</u>

Symbolically, it is expressed as:

 $\mathsf{E}_{\mathsf{Y}} = \frac{\Delta q}{\Delta y} \times \frac{y}{q}$

Where, E_{Y} = Elasticity of demand q = Original quantity demanded

 $\Delta q =$ Change in quantity demanded

y = Original consumer's income Δy = Change in consumer's income

Types of Income Elasticity of demand

1. Positive income elasticity of demand (E_Y>0)

If there is direct relationship between income of the consumer and demand for the commodity, then income elasticity will be positive. That is, if the quantity demanded for a commodity increases with the rise in income of the consumer and vice versa, it is said to be positive income elasticity of demand. For example: as the income of consumer increases, they consume more of superior (luxurious) goods. On the contrary, as the income of consumer decreases, they consume less of luxurious goods.

2. Negative income elasticity of demand ($E_Y < 0$)

If there is inverse relationship between income of the consumer and demand for the commodity, then income elasticity will be negative. That is, if the quantity demanded for a commodity decreases with the rise in income of the consumer and vice versa, it is said to be negative income elasticity of demand.

3. Zero income elasticity of demand (E_Y=0)

If the quantity demanded for a commodity remains constant with any rise or fall in income of the consumer and, it is said to be zero income elasticity of demand. For example: In case of basic necessary goods such as salt, kerosene, electricity, etc. there is zero income elasticity of demand

III. Cross Elasticity of Demand

It is the ratio of proportionate change in the quantity demanded of Y to a given proportionate change in the price of the related commodity X. It is a measure of relative change in the quantity demanded of a commodity due to a change in the price of its substitute/complement. It can be expressed as:

Ce Proportionate change in the quantity demanded of Y Proportionate change in the price of X

Cross elasticity may be infinite or zero if the slightest change in the price of X causes a substantial change in the quantity demanded of Y. It is always the case with goods which have perfect substitutes for one another. Cross elasticity is zero, if a change in the price of one commodity will not affect the quantity demanded of the other. In the case of goods which are not related to each other, cross elasticity of demand is zero.

Types of Cross Elasticity of Demand: 1. Positive:

When goods are substitute of each other then cross elasticity of demand is positive. In other words, when an increase in the price of Y leads to an increase in the demand of X. For instance, with the increase in price of tea, demand of coffee will increase. In fig. 21 quantity has been measured on OX-axis and price on OY-axis. At price OP of Y-commodity, demand of X-commodity is OM. Now as price of Y commodity increases to OP_1 demand of X-commodity increases to OM_1 Thus, cross elasticity of demand is positive



2. Negative:

In case of complementary goods, cross elasticity of demand is negative. A proportionate increase in price of one commodity leads to a proportionate fall in the demand of another commodity because both are demanded jointly. In fig. 22 quantity has been measured on OX-axis while price has been measured on OY-axis. When the price of commodity increases from OP to OP_1 quantity demanded falls from OM to OM_1 . Thus, cross elasticity of demand is negative.



3. Zero:

Cross elasticity of demand is zero when two goods are not related to each other. For instance, increase in price of car does not effect the demand of cloth. Thus, cross elasticity of demand is zero. It has been shown in fig. 23.



Therefore, it depends upon substitutability of goods. If substitutability is perfect, cross elasticity is infinite; if on the other hand, substitutability does not exist, cross elasticity is zero. In the case of complementary goods like jointly demanded goods cross elasticity is negative. A rise in the price of one commodity X will mean not only decrease in the quantity of X but also decrease in the quantity demanded of Y because both are demanded together.

Measurement of Elasticity of Demand:

There are three methods of measuring elasticity of demand. These are: (a) Total outlay (revenue) method

- (b) Point elasticity method
- (c) Arc elasticity method

1. Elasticity and Total Revenue or Outlay Method:

Marshall offered the method of total revenue or total outlay for estimating elasticity of demand. What the sellers receive from the sale of commodities is called total expenditure or outlay of buyers. There is no difference between total revenue and total outlay since what is spent by the buyers is received as income by the sellers.

Thus, total outlay/revenue is the price multiplied by the quantity purchases, i.e., TR = $P \times Q$.

In this method we can only estimate whether the good is elastic or inelastic in nature and can't find the precise value of elasticity

2. Point Elasticity Method of Measurement:

When the change in price is infinite simply small, Marshallian method may not provide accurate estimate of elasticity of demand. In that case, a geometrical method may be employed. This method aims at measuring elasticity of demand at a particular point on a demand curve. So long, we tried to calculate the elasticity over certain area or segment of a demand curve and the terms elastic, inelastic and unit elastic had been applied to the whole demand curve. However, such is not true. It may happen that the demand for a product can be elastic in one price range and inelastic in another.

In fact, the degree of elasticity varies from one price range to another. So, it is better to calculate elasticity at a particular point on a demand curve to have an accurate estimate. This is explained in terms of Fig. 2.51.



Demand curve is DD_1 . To measure elasticity of demand at point E, we have drawn a straight line CF tangent to DD_1 at point E. Points E and H are very close to each other. As price declines from OP_1 to OP_2 , quantity demanded rises from OM_1 to OM_2 .

3. Arc Elasticity Method:

For very small movements in price and quantity, point elasticity method is an appropriate one. In other words, point elasticity method measures (price) elasticity of demand at a particular point on the demand curve. However, if price change is somewhat of a larger magnitude then geometrical method may give misleading estimate. To avoid this problem, elasticity is measured over an arc of the demand curve. In other words, when we intend to estimate (price) elasticity of demand over some portion (i.e., the arc) of the demand curve, we then have arc elasticity method. Sometimes we know two prices and two quantities. Under the circumstance, the point elasticity method may not provide good estimate. What is required in this case is the average elasticity of two prices and two quantities. This is called 'arc' elasticity, because it measures the average elasticity on an arc of a demand curve.

Factors Determining Elasticity of Demand:

There are various factors on which elasticity of demand depends:

(a) Nature of the Commodity:

In the first place, it depends on the nature of the commodity. Commodities which are supposed to be essential or critical to our daily lives must have an inelastic demand, since price change of these items does not bring about a greater change in quantity demanded. But, luxury goods have an elastic demand. Demand for these good can be quickly reduced when their prices rise. When their prices fall, consumers demand these goods in larger quantities. However, whether a particular commodity is a necessary or a luxury depends on income, tastes and preferences of the consumer.

A particular good may be necessary to someone having an inelastic demand. Same commodity may be elastic to another consumer. For instance, owning a TV may be a luxury item to a low income person. But the same may be bought as an essential item by a rich person.

(b) Availability of Substitutes:

Secondly, commodities having large number of substitutes must have an elastic demand. Some products, such as Horlicks, Complan, Viva, Maltova, Milo, etc.,

have quite a large number of close substitutes. A change in the price of, say, Horlicks—the prices of other substitutes remaining constant—will lead a consumer to substitute one beverage for another. If the price of Horlicks goes down, buyers will demand more of it and less of its substitutes. Conversely, demand is fairly inelastic in the case of those commodities which do not have a large number of substitutes.

(c) Extent of Uses:

Thirdly, there are some commodities which can be used for a variety of purposes. For example, electricity. If price per unit of electricity consumed falls, people will reduce their consumption of its substitutes (e.g., coal, gas, etc.) and increase the consumption of electricity.Coefficient of price elasticity of demand in this case must be greater than one. On the other hand, when a commodity is used only for one or two purposes, a price change will have less effect on its quantity demanded and, therefore, demand will be inelastic.

(d) Habit Good:

Fourthly, there are some commodities consumed out of habits and conventions they have an elastic demand. Even in the face of rising prices of those commodities or falling income, people will consume those (such as, cigarette).For this reason, price elasticity as well as income elasticity of demand for this type of commodity is inelastic. Further, gold ornaments are used in the marriage ceremony rather out of convention, though gold prices are rising. When gold is used in this way, its demand becomes inelastic.

(e) Time Dimension:

Fifthly, shorter the time, lower will be the elasticity of demand. This is because in the short run satisfactory substitutes of a product may not be available. Thus, demand for a product in the short run usually becomes inelastic. Such a commodity will be elastic in the long run when close substitutes may be produced. Thus, the response of quantity demanded to a change in price will tend to be greater (smaller), the longer (shorter) the time-span considered. In the long run, there is enough time for adjustments to be made following a change in price.

(f) The Importance of being Unimportant:

Sixthly, people often pay little attention to the price of a product if it constitutes a relatively small part in their budget. For example, if the fire of railway ticket of a tourist who travels by rail once in a year is increased form Rs. 125 to Rs. 135, then he may not postpone his journey. This means he is unresponsive to such price hike and his demand is inelastic. This is called 'the importance of being unimportant'.

(g) Durability:

Finally, durable commodities have an elastic demand. If the price of these goods rises, people will spend less on these goods. On the other hand, following a fall in the price of durable commodities (e.g., refrigerator), people demand more of them. In the case of non-durable commodities, demand is elastic.

Importance of the Concept of Elasticity of Demand:

(a) Price Determination:

Use of the concept of elasticity of demand is required in the price determination of a commodity under different market conditions. Under perfect competition, in the short run in which supply is absolutely inelastic price depends upon the elasticity of demand. If demand suddenly falls—supply remaining fixed—prices will fall, and, if demand suddenly rises, prices will rise as output cannot be increased. Again, the stability of prices also depends on the elasticity of demand and elasticity of supply. If either the demand or the supply is elastic, fluctuations in prices will be within narrow limits.

(b) Wage Determination:

The concept of elasticity of demand is employed in wage determination. Wages, in modern days, are determined through the process of collective bargaining. Trade union will be successful in raising the wage rate provided labour demand is deemed to be inelastic. This is because of the fact that the degree of substitution between labour and other labour substituting inputs is less. Trade union becomes cautious in demanding higher wage rates when the demand for labour is said to be elastic. Under the circumstance, the employer may be forced to employ more machines (assumed to be a cheaper input) than labour.

(c) Policy Determination:

The concept of elasticity of demand is of great importance to a finance minister. While imposing tax or raising the existing tax rates, the finance minister must have sufficient knowledge of the elasticity of demand for the taxed commodity. If the demand for the product is inelastic, the purpose of the tax—say revenue-earning—will be served. That is why taxes are mostly imposed or rates of taxes are raised in the case of commodities having inelastic demand.

(d) Exchange Rate Determination:

In international trade too, the concept may be employed. For instance, as far as exchange rate (i.e., the rate at which one currency is exchanged for another currency) determination is concerned, the concept of elasticity of demand is of great importance. The concept of elasticity of demand is used to justify whether devaluation of a currency is a right step in curbing balance of payment problems of a country. Devaluation is expected to correct the balance of payments disequilibrium if the sum of the elasticity of demand for export and import exceeds unity.

In international trade theory, within the limits set by the comparative costs, the terms of trade also depends on the elasticity of demand of each country for the goods of other countries.

SUBSTITUTION AND INCOME EFFECT

The income effect expresses the impact of increased purchasing power on consumption, while the substitution effect describes how consumption is impacted by changing relative income and prices. These economics concepts express changes in the market and how they impact consumption patterns for consumer goods and services.Different goods and services experience these changes in different ways. Some products, called inferior goods, generally decrease in the consumption whenever incomes increase. Consumer spending and consumption of normal goods typically increases with higher purchasing power, which is in contrast with inferior goods

Income Effect

The income effect is the change in the consumption of goods based on income. This means consumers will generally spend more if they experience an increase in income, and they may spend less if their income drops. But the effect doesn't dictate what kind of goods consumers will buy. They may opt to purchase more expensive goods in lesser quantities or cheaper goods in higher quantities, depending on their circumstances and preferences. The income effect can be both direct and indirect. When a consumer chooses to make changes to the way they spend because of a change in income, the income effect is said to be direct. For example, a consumer may choose to spend less on clothing because their income has dropped. An income effect becomes indirect when a consumer is faced with making buying choices because of factors not related to their income. For instance, food prices may go up leaving the consumer with less income to spend on other items. This may force them to cut back on dining out, resulting in an indirect income effect.

The marginal propensity to consume explains how consumers spend based on income. It is a concept based on the balance between the spending and saving habits of consumers. The marginal propensity to consume is included in a larger theory of macroeconomics known as Keynesian economics. The theory draws comparisons between production, individual income, and the tendency to spend more of it.

Substitution Effect

The substitution may occur when a consumer replaces cheaper or moderately priced items with ones that are more expensive when a change in finances occurs. For example, a good return on an investment or other monetary gains may prompt a consumer to replace the older model of an expensive item for a newer one.

The inverse is true when incomes decrease. Substitution in the direction of buying lower-priced items has a generally negative consequence on retailers because it means lower profits. It also means fewer options for the consumer.

While the substitution effect changes consumption patterns in favor of the more affordable alternative, even a modest reduction in price may make a more expensive product more attractive to consumers. For instance, if private college tuition is more expensive than public college tuition—and money is a concern consumers will naturally be attracted to public colleges. But a small decrease in private tuition costs may be enough to motivate more students to begin attending private schools. The substitution effect is not just limited to consumers. When companies outsource part of their operations, they are using the substitution effect. Using cheaper labor in a different country or by hiring a third party results in a drop in costs. This nets a positive result for the corporation, but a negative effect for the employees who may be replaced.

Following are important differences between income effect and substitution effect;

BASIS FOR COMPARISON	INCOME EFFECT	SUBSTITUTION EFFECT
Meaning	Income effect refers to the change in the demand of a commodity caused by the change in consumer's real income.	Substitution effect means an effect due to the change in price of a good or service, leading consumer to replace higher priced items with lower prices ones.
Reflected by	Movement along income-consumption curve	Movement along price- consumption curve
Effect of	Income being freed up.	Relative price changes.
Expresses	Impact of rise or fall in purchasing power on consumption.	Change in quantity demanded of a good due to change in prices.
Rise in price of a good	Reduces disposable income, which in turn decrease quantity demanded.	As alternative goods are comparatively cheaper and so customers will switch to other goods.
Fall in price of a good	Increases real spending power of a consumer that allows customers to buy more, with the given budget.	Will make it cheaper than its substitutes, which will attract more customers and result in higher demand.

NORMAL AND INFERIOR GOODS

Normal goods refer to the goods which are demanded in increasing quantities as the income of consumer rises and in decreasing quantity as the income of consumer drops, but price remains same. Although, the rate of increase in demand will be lower than the increase in income. Furniture, clothing, automobiles are some common examples which fall under this category.

The quantity demanded of normal goods goes up with the rise in consumer's real income but at different rates and at different levels of income, i.e. the demand for good increases at a faster rate with an increase in income, however, slows down with a further rise in income.



In economics, inferior goods do not mean sub-standard goods but is relates to the affordability of the goods. These goods are the one whose demand drops with the increase in consumer's income and vice versa. Such goods have better quality alternatives.

This concept can be understood with an example, bidi and cigarettes are two products, which are consumed by the consumers. Suppose both the demand curve of both the products is downward sloping however if the consumer's income goes up, then they will start buying cigarettes instead of bidi. The main cause of this

mindset of customers is that the commodity is deemed to be inferior if there is a fall in its demand when there is a rise in their income, beyond a particular level.



BASIS FOR COMPARISON	NORMAL GOODS	INFERIOR GOODS
Meaning	Normal goods are the goods whose demand goes up with the rise in consumer's income.	Inferior goods are the goods whose demand falls down with the rise in consumer's income.

VISHAKHA MANKAR

Shantiniketan Business School, Nagpur

BASIS FOR COMPARISON	NORMAL GOODS	INFERIOR GOODS
Demand Curve	Quantity X	Quantity X
Income Elasticity	Positive	Negative
Relationship between income changes and demand curve	Direct Relationship	Inverse Relationship
Preferred when	Prices are high	Prices are low
Examples	iphone, LG LED TV, etc.	Coarse Cloth, Cycle, etc.

INDIFFERENCE CURVE ANALYSIS

An indifference curve is a curve that represents all the combinations of goods that give the same satisfaction to the consumer. Since all the combinations give the same amount of satisfaction, the consumer prefers them equally. Hence the name indifference curves.

Here is an example to understand the indifference curve better. Peter has 1 unit of food and 12 units of clothing. Now, we ask Peter how many units of clothing he is willing to give up in exchange for an additional unit of food so that his level of satisfaction remains unchanged.

Peter agrees to give up 6 units of clothing for an additional unit of food. Hence, we have two combinations of food and clothing giving equal satisfaction to Peter as follows:

- 1. 1 unit of food and 12 units of clothing
- 2. 2 units of food and 6 units of clothing

By asking him similar questions, we get various combinations as follows:

Combination	Food	Clothing
A	1	12
В	2	6
С	3	4
D	4	3



Fig. 1 : A Consumer's Indifference Curve

The diagram shows an Indifference curve (IC). Any combination lying on this curve gives the same level of consumer satisfaction. Another name for it is Iso-Utility Curve.

Indifference Map

An Indifference Map is a set of Indifference Curves. It depicts the complete picture of a consumer's preferences. The following diagram showing an indifference map consisting of three curves:



Fig. 2 : Indifference Map

We know that a consumer is indifferent among the combinations lying on the same indifference curve. However, it is important to note that he prefers the combinations on the higher indifference curves to those on the lower ones. This is because a higher indifference curve implies a higher level of satisfaction. Therefore, all combinations on IC1 offer the same satisfaction, but all combinations on IC2 give greater satisfaction than those on IC1.

Assumptions of Indifference Curve Analysis:

The indifference curve analysis retains some of the assumptions of the cardinal theory, rejects others and formulates its own. The assumptions of the ordinal theory are the following:

(1) The consumer acts rationally so as to maximize satisfaction.

(2) There are two goods X and Y.

(3) The consumer possesses complete information about the prices of the goods in the market.

(4) The prices of the two goods are given.

(5) The consumer's tastes, habits and income remain the same throughout the analysis.

(6) He prefers more of X to less of Y or more of Y to less of X.

(7) An indifference curve is negatively inclined sloping downward.

Properties of an Indifference Curve or IC

Here are the properties of an indifference curve:

> An IC slopes downwards to the right

This slope signifies that when the quantity of one commodity in combination is increased, the amount of the other commodity reduces. This is essential for the level of satisfaction to remain the same on an indifference curve.

> An IC is always convex to the origin

From our discussion above, we understand that as Peter substitutes clothing for food, he is willing to part with less and less clothing. This is the diminishing marginal rate of substitution. The rate gives a convex shape to the indifference curve. However, there are two extreme scenarios:

- 1. Two commodities are perfect substitutes for each other In this case, the indifference curve is a straight line, where MRS is constant.
- 2. Two goods are perfect complementary goods An example of such goods would be gasoline and water in a car. In such cases, the IC will be L-shaped and convex to the origin.

> Indifference curves never intersect each other

Two ICs will never intersect each other. Also, they need not be parallel to each other either. Look at the following diagram:



Fig. 3 : Intersecting Indifference Curves

Fig 3 shows two ICs intersecting each other at point A. Since points A and B lie on IC1, they give the same satisfaction level to an individual. Similarly, points A and C give the same satisfaction level, as they lie on IC2. Therefore, we can imply that B and C offer the same level of satisfaction, which is logically absurd. Hence, no two ICs can touch or intersect each other.

A higher IC indicates a higher level of satisfaction as compared to a lower IC

A higher IC means that a consumer prefers more goods than not.

> An IC does not touch the axis

This is not possible because of our assumption that a consumer considers different combinations of two commodities and wants both of them. If the curve touches either of the axes, then it means that he is satisfied with only one commodity and does not want the other, which is contrary to our assumption.

DEMAND FORECASTING

The formulation of appropriate and useful production policy is an important aspect for an enterprise. This involves determination of level of production, manpower requirements, equipment and inventory levels etc. All these decisions are basically related to the size of production, which in turn can be determined from potential demand for the product. It is a technique for estimation of probable demand for a product or services in the future. It is based on the analysis of past demand for that product or service in the present market condition. Demand forecasting should be done on a scientific basis and facts and events related to forecasting should be considered.

Therefore, in simple words, we can say that after gathering information about various aspect of the market and demand based on the past, an attempt may be made to estimate future demand. This concept is called forecasting of demand.

Objectives of Demand Forecasting:

Demand forecasting constitutes an important part in making crucial business decisions. The objectives of demand forecasting are divided into short and long-term objectives, which are shown in Figure-1:



I. Short-term Objectives:

a. Formulating production policy:

Helps in covering the gap between the demand and supply of the product. The demand forecasting helps in estimating the requirement of raw material in future, so that the regular supply of raw material can be maintained. It further helps in maximum utilization of resources as operations are planned according to forecasts. Similarly, human resource requirements are easily met with the help of demand forecasting.

b. Formulating price policy:

Refers to one of the most important objectives of demand forecasting. An organization sets prices of its products according to their demand. For example, if

an economy enters into depression or recession phase, the demand for products falls. In such a case, the organization sets low prices of its products.

c. Controlling sales:

Helps in setting sales targets, which act as a basis for evaluating sales performance. An organization make demand forecasts for different regions and fix sales targets for each region accordingly.

d. Arranging finance:

Implies that the financial requirements of the enterprise are estimated with the help of demand forecasting. This helps in ensuring proper liquidity within the organization.

II. Long-term Objectives:

a. Deciding the production capacity:

Implies that with the help of demand forecasting, an organization can determine the size of the plant required for production. The size of the plant should conform to the sales requirement of the organization.

b. Planning long-term activities:

Implies that demand forecasting helps in planning for long term. For example, if the forecasted demand for the organization's products is high, then it may plan to invest in various expansion and development projects in the long term.

Factors Influencing Demand Forecasting:

Demand forecasting is a proactive process that helps in determining what products are needed where, when, and in what quantities. There are a number of factors that affect demand forecasting.



i. Types of Goods:

Affect the demand forecasting process to a larger extent. Goods can be producer's goods, consumer goods, or services. Apart from this, goods can be established and new goods. Established goods are those goods which already exist in the market, whereas new goods are those which are yet to be introduced in the market.

Information regarding the demand, substitutes and level of competition of goods is known only in case of established goods. On the other hand, it is difficult to forecast demand for the new goods. Therefore, forecasting is different for different types of goods.

ii. Competition Level:

Influence the process of demand forecasting. In a highly competitive market, demand for products also depend on the number of competitors existing in the market. Moreover, in a highly competitive market, there is always a risk of new entrants. In such a case, demand forecasting becomes difficult and challenging.

iii. Price of Goods:

Acts as a major factor that influences the demand forecasting process. The demand forecasts of organizations are highly affected by change in their pricing policies. In such a scenario, it is difficult to estimate the exact demand of products.

iv. Level of Technology:

Constitutes an important factor in obtaining reliable demand forecasts. If there is a rapid change in technology, the existing technology or products may become obsolete. For example, there is a high decline in the demand of floppy disks with the introduction of compact disks (CDs) and pen drives for saving data in computer. In such a case, it is difficult to forecast demand for existing products in future.

v. Economic Viewpoint:

Play a crucial role in obtaining demand forecasts. For example, if there is a positive development in an economy, such as globalization and high level of investment, the demand forecasts of organizations would also be positive.

Steps of Demand Forecasting:

The Demand forecasting process of an organization can be effective only when it is conducted systematically and scientifically.



1. Setting the Objective:

Refers to first and foremost step of the demand forecasting process. An organization needs to clearly state the purpose of demand forecasting before initiating it.

Setting objective of demand forecasting involves the following:

a. Deciding the time period of forecasting whether an organization should opt for short-term forecasting or long-term forecasting

b. Deciding whether to forecast the overall demand for a product in the market or only- for the organizations own products

c. Deciding whether to forecast the demand for the whole market or for the segment of the market

d. Deciding whether to forecast the market share of the organization

2. Determining Time Period:

Involves deciding the time perspective for demand forecasting. Demand can be forecasted for a long period or short period. In the short run, determinants of demand may not change significantly or may remain constant, whereas in the long run, there is a significant change in the determinants of demand. Therefore, an organization determines the time period on the basis of its set objectives.

3. Selecting a Method for Demand Forecasting:

Constitutes one of the most important steps of the demand forecasting process Demand can be forecasted by using various methods. The method of demand forecasting differs from organization to organization depending on the purpose of forecasting, time frame, and data requirement and its availability. Selecting the suitable method is necessary for saving time and cost and ensuring the reliability of the data.

4. Collecting Data:

Requires gathering primary or secondary data. Primary' data refers to the data that is collected by researchers through observation, interviews, and questionnaires for a particular research. On the other hand, secondary data refers to the data that is collected in the past; but can be utilized in the present scenario/research work.

5. Estimating Results:

Involves making an estimate of the forecasted demand for predetermined years. The results should be easily interpreted and presented in a usable form. The results should be easy to understand by the readers or management of the organization.

NEED OF DEMAND FORECASTING:

Demand plays a crucial role in the management of every business. It helps an organization to reduce risks involved in business activities and make important business decisions. Apart from this, demand forecasting provides an insight into the organization's capital investment and expansion decisions.

i. Fulfilling objectives:

Implies that every business unit starts with certain pre-decided objectives. Demand forecasting helps in fulfilling these objectives. An organization estimates the current demand for its products and services in the market and move forward to achieve the set goals.For example, an organization has set a target of selling 50, 000 units of its products. In such a case, the organization would perform demand forecasting for its products. If the demand for the organization's products is low, the organization would take corrective actions, so that the set objective can be achieved.

ii. Preparing the budget:

Plays a crucial role in making budget by estimating costs and expected revenues. For instance, an organization has forecasted that the demand for its product, which is priced at Rs. 10, would be 10, 00, 00 units. In such a case, the total expected revenue would be $10^* 100000 = \text{Rs.} 10, 00, 000$. In this way, demand forecasting enables organizations to prepare their budget.

iii. Stabilizing employment and production:

Helps an organization to control its production and recruitment activities. Producing according to the forecasted demand of products helps in avoiding the wastage of the resources of an organization. This further helps an organization to hire human resource according to requirement. For example, if an organization expects a rise in the demand for its products, it may opt for extra labor to fulfill the increased demand.

iv. Expanding organizations:

Implies that demand forecasting helps in deciding about the expansion of the business of the organization. If the expected demand for products is higher, then the organization may plan to expand further. On the other hand, if the demand for products is expected to fall, the organization may cut down the investment in the business.

v. Taking Management Decisions:

Helps in making critical decisions, such as deciding the plant capacity, determining the requirement of raw material, and ensuring the availability of labor and capital.

vi. Evaluating Performance:

Helps in making corrections. For example, if the demand for an organization's products is less, it may take corrective actions and improve the level of demand by enhancing the quality of its products or spending more on advertisements.

vii. Helping Government:

Enables the government to coordinate import and export activities and plan international trade

TECHNIQUES OF DEMAND FORECASTING



A) Survey Method:

Survey method is one of the most common and direct methods of forecasting demand in the short term. This method encompasses the future purchase plans of consumers and their intentions. In this method, an organization conducts surveys with consumers to determine the demand for their existing products and services and anticipate the future demand accordingly.



i. Experts' Opinion Poll:

Refers to a method in which experts are requested to provide their opinion about the product. Generally, in an organization, sales representatives act as experts who can assess the demand for the product in different areas, regions, or cities.

Sales representatives are in close touch with consumers; therefore, they are well aware of the consumers' future purchase plans, their reactions to market change, and their perceptions for other competing products. They provide an approximate estimate of the demand for the organization's products. This method is quite simple and less expensive.

However, it has its own limitations, which are discussed as follows:

VISHAKHA MANKAR

Shantiniketan Business School, Nagpur

a. Provides estimates that are dependent on the market skills of experts and their experience. These skills differ from individual to individual. In this way, making exact demand forecasts becomes difficult.

b. Involves subjective judgment of the assessor, which may lead to over or underestimation.

c. Depends on data provided by sales representatives who may have inadequate information about the market.

d. Ignores factors, such as change in Gross National Product, availability of credit, and future prospects of the industry, which may prove helpful in demand forecasting.

ii. Delphi Method:

Refers to a group decision-making technique of forecasting demand. In this method, questions are individually asked from a group of experts to obtain their opinions on demand for products in future. These questions are repeatedly asked until a consensus is obtained.

In addition, in this method, each expert is provided information regarding the estimates made by other experts in the group, so that he/she can revise his/her estimates with respect to others' estimates. In this way, the forecasts are cross checked among experts to reach more accurate decision making.

iii. Market Experiment Method:

Involves collecting necessary information regarding the current and future demand for a product. This method carries out the studies and experiments on consumer behavior under actual market conditions. In this method, some areas of markets are selected with similar features, such as population, income levels, cultural background, and tastes of consumers.

The market experiments are carried out with the help of changing prices and expenditure, so that the resultant changes in the demand are recorded. These results help in forecasting future demand.

B) Statistical Methods:

Statistical methods are complex set of methods of demand forecasting. These methods are used to forecast demand in the long term. In this method, demand is forecasted on the basis of historical data and cross-sectional data.

Historical data refers to the past data obtained from various sources, such as previous years' balance sheets and market survey reports. On the other hand, cross-sectional data is collected by conducting interviews with individuals and performing market surveys. Unlike survey methods, statistical methods are cost effective and reliable as the element of subjectivity is minimum in these methods.





i.Trend Projection Method:

Trend projection or least square method is the classical method of business forecasting. In this method, a large amount of reliable data is required for forecasting demand. In addition, this method assumes that the factors, such as sales and demand, responsible for past trends would remain the same in future.

In this method, sales forecasts are made through analysis of past data taken from previous year's books of accounts. In case of new organizations, sales data is taken from organizations already existing in the same industry. This method uses time-series data on sales for forecasting the demand of a product.

Table-1: Time Series Data on Sales of XYZ Organization	
Year	Sales (In 1000 tones)
2000	20
2001	24
2002	22
2003	30
2004	36
2005	28

The trend projection method undertakes three more methods in account, which are as follows:

i. Graphical Method:

Helps in forecasting the future sales of an organization with the help of a graph. The sales data is plotted on a graph and a line is drawn on plotted points.

Let us learn this through a graph shown in Figure-13:



Figure-13 shows a curve which is plotted by taking into the account the sales data of XYZ Organization (Table-1). Line P is drawn through mid-points of the curve and S is a straight line. These lines are extended to get the future sales for year 2010 which is approximately 47 tons. This method is very simple and less expensive; however, the projections made by this method may be based on the personal bias of the forecaster.

ii. Fitting Trend Method:

Implies a least square method in which a trend line (curve) is fitted to the timeseries data of sales with the help of statistical techniques.

In this method, there are two types of trends taken into account, which are explained as follows:

a. Linear Trend:

Implies a trend in which sales show a rising trend.

In linear trend, following straight line trend equation is fitted: S = A+BT

Where

S= annual sales

T=time (in years)

A and B are constant

B gives the measure of annual increase in sales

b. Exponential Trend:

Implies a trend in which sales increase over the past years at an increasing rate or constant rate.

The appropriate trend equation used is as follows:

 $Y = aT^b$ Where

Y= annual sales

T= time in years

a and b are constant

Converting this into logarithm, the equation would be:

Log Y = Log a + b Log T

The main advantage of this method is that it is simple to use. Moreover, the data requirement of this method is very limited (as only sales data is required), thus it is inexpensive method.

ii. Barometric Method:

In barometric method, demand is predicted on the basis of past events or key variables occurring in the present. This method is also used to predict various economic indicators, such as saving, investment, and income. This method was introduced by Harvard Economic Service in 1920 and further revised by National Bureau of Economic Research (NBER) in 1930s.

This technique helps in determining the general trend of business activities. For example, suppose government allots land to the XYZ society for constructing buildings. This indicates that there would be high demand for cement, bricks, and steel

iii. Econometric Methods:

Econometric methods combine statistical tools with economic theories for forecasting. The forecasts made by this method are very reliable than any other method. An econometric model consists of two types of methods namely, regression model and simultaneous equations model.

These two types of methods are explained as follows:

i. Regression Methods:

Refer to the most popular method of demand forecasting. In regression method, the demand function for a product is estimated where demand is dependent variable and variables that determine the demand are independent variable.

If only one variable affects the demand, then it is called single variable demand function. Thus, simple regression techniques are used. If demand is affected by many variables, then it is called multi-variable demand function. Therefore, in such a case, multiple regression is used.

The simple and multiple regression techniques are discussed as follows: a. Simple Regression:

Refers to studying the relationship between two variables where one is independent variable and the other is dependent variable.

The equation to calculate simple regression is as follows:

Y = a + bx

Where, Y = Estimated value of Y for a given value of X

b = Amount of change in Y produced by a unit change in X

a and b = Constants

b. Multiple Regression:

Refers to studying the relationship between more than one independent and dependent variables.

In case of two independent variables and one dependent variable, following equation is used to calculate multiple regression:

Y = a + b1X1 + b2X2

Where, Y (Dependent variable) = Estimated value of Y for a given value of X1 and X1

X1 and X2 = Independent variables

b1 = Amount of change in Y produced by a unit change in X1

b2 = Amount of change in Y produced by a unit change in X2

a, b1 and b2 = Constants