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MUKTHAGANGOTHRI, MYSORE – 570 006.

DEPARTMENT OF STUDIES AND RESEARCH IN MANAGEMENT

M.B.A I Semester

Course – 2

MANAGERIAL ECONOMICS

BLOCK

1

INTRODUCTION TO MANAGERIAL ECONOMICS

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BLOCK – 1 : INTRODUCTION TO MANAGERIAL ECONOMICS

The block 1 contains 5 units (unit-1 to unit-5) where the unit-1 includes information relating to importance, scope and significance of Managerial Economics, fundamental economic concepts, objectives of the firm etc further unit-2 encompasses information relating to demand analysis, law of demand, individual demand and market demand, factors influencing market demand etc next unit, unit-3 includes information relating to price elasticity of demand, income elasticity of demand, cross elasticity of demand, applications of elasticity of demand concept etc further unit- 4 includes information relating to demand estimation and forecasting, short term demand estimation, objectives and long term demand forecasting, steps in demand estimation etc and finally unit-5 includes information relating to supply analysis, determinants of supply, supply function, law of supply, elasticity of supply, factors determining elasticity of supply, market equilibrium etc.

UNIT - 1 : INTRODUCTION TO MANAGERIAL ECONOMICS

STRUCTURE:

1.0 OBJECTIVES

After studying this Unit, you will be able to ;

- Understand the meaning and importance of managerial economics
- Identifi the role and responsibilities of a managerial economist
- Discuss the scope of managerial economics
- Know the salient economic concepts
- Understand the various objectives of a firm
- Highlight the importance of economics in relation to other disciplines

1.1 INTRODUCTION

Economics is the study of how societies choose to use scarce productive resources having alternate uses, to satisfy unlimited wants of people. As a social science, economics studies human behaviour as a relationship between numerous wants and scarce means with alternative uses. Scarcity is the source of an economic problem. Scarcity is a relative term. It can be defined as excess demand, that is, demand more than the supply. For example, inflation occurs due to scarcity of goods and unemployment is due to scarcity of jobs. Scarcity of resources forces people to choose among alternatives. Making a choice is not easy as resources are limited which can be put to alternative uses. Economics therefore is the art of rational decision making. The study of economics is very significant to modern day businesses as taking right decisions at the right time is necessary for the success of the business.

Managerial economics is the study of allocation of resources available to a business firm. It is fundamentally concerned with the art of economizing, making rational choices that would yield maximum returns out of minimum resources and efforts. It is the selecting the best alternative among alternative courses of action.

Managerial economics is a specialized discipline of management studies which deals with application of economic theory and techniques to business management. It is evolved by the integration of economic theory and tools and techniques of analysis (decision sciences) along with business management theory and practice. It is the application of economic concepts, methods and tools of analysis to business decision making process.

Business decision making is a complicated process as businesses have multiple goals and there is no certainty in business due to their dynamic nature. As a result, economic

theory does not provide clear solutions to business problems. However, economic theory helps in arriving at better decisions. Many gaps exist between theory and actual business in practice. In economic theory, a firm identifies profit maximizing output by equating marginal revenue and marginal cost. But, in actual practice, this may not be possible due to resource constraints. Managerial economics attempts to bridge the gap between analytical problems of economic theory and decision problems faced in real business.

1.2 IMPORTANCE OF ECONOMICS

The study of Economics is important for the following reasons:

1. It helps to understand how to satisfy human wants with scarce resources.
2. Economics is all about choice and therefore affects everyone. It therefore impacts decision-making. Individuals, businesses and governments are all faced with making choices in situations where resources are scarce. It is applicable to a wide range of fields, including business, finance, administration, law, local and national government and in many aspects of everyday life.It helps in the optimum utilization of resources. The amount of natural resources available to us is limited. Economics provides a mechanism for looking at possible ways to optimize resource utilization and reduce wastages.
3. Learning Economics gives insights into the general environment of resource allocation decisions, opportunity costs and project evaluation.
4. It helps to discover new factors that may lead to increase in national wealth.
5. A householder can allocate his income in such a way that his family gets maximum satisfaction.

1.3 SCOPE OF ECONOMICS

The horizon of economics is gradually expanding day by day. It is no longer a branch of knowledge that deals only with the production and consumption. Though the basic thrust of the subject still remains the same, that is, effective utilization of the scarcely available resources efficiently, the study focuses on other aspects as well. Some of the other branches of economics are:

1. **Microeconomics**: This is considered to be the basic economics. Microeconomics may be defined as that branch of economic analysis which studies the economic behaviour of an individual unit or a person or a household. The study of a business unit is called as Managerial Economics. It studies the flow of economic resources

(factors of production) from the households (the resource owners) to business firms and flow of goods and services back from the business firms to households. It is a study of individual decision-making with regard to price fixation and output and its reactions to the changes in demand and supply conditions. Hence, micro economics is also called as 'price theory'.

2. **Macroeconomics**: Macroeconomics may be defined as that branch of economic analysis which studies behaviour of not one particular unit, but of all the decision-making units combined together. Macroeconomics is astudy in aggregates. Hence it is often called Aggregative Economics.Macroeconomics deals with the behaviour of aggregates like total employment, gross national product (GNP), national income, general price level, etc. So, macroeconomics is also known as 'income theory'.
3. **International Economics**: Nations trade with each other bringing in foreign exchange reserves. The role of international economics is getting more and more significant now a days.
4. **Public Finance**:Public Finance or fiscal economics is another important branch which analyses the role of government in an economy.
5. **Development Economics**: This branch gained importance after the Second World War. Many countries required heavy push and stimulation for growth and development thus bringing in the branch called development economics.
6. **Urban and Rural Economics**: The urban-rural divide stresses the need for urban economics and rural economics. Because of the growing gap between them and specific problems each has, economists have realised that there should bespecific focus on urban areas and rural areas.

Besides the above, there are many new areas where the role of economics is recognized, such as, welfare economics, monetary economics, transport economics, labour economics, agricultural economics, etc.

1.4 SIGNIFICANCE OF MANAGERIAL ECONOMICS

Managerial economics is an application of economic theory in solving business problems. It helps in identifying the best course of alternatives available. It provides necessary skills to enhance business goals and functions. In this sense, it is concerned with the interaction between internal business operations and the business environment outside, such as, marketing, business development, liaising with government, investment climate and finances required.

Managerial economics makes a thorough analysis of key elements involved in business decisions. A manager who wants to increase his market share should have a thorough knowledge about the size, consumers' tastes and preferences, the level of competition, their products, etc. All these inputs will help them have a better understanding of the market. Economic analysis helps in assisting them in designing the course of action and also in measuring the effectiveness of the decisions arrived. Managers understand the intricacies of business problems which make problem solving easier and better. They can arrive at correct and right decisions. They are guided to identify key variables in the business decision making process and in optimizing it.

Most managerial decisions are to be taken under conditions of uncertainty. The uncertainty can be reduced to a certain extent if a detailed and exhaustive investigation is taken up. For example, if a firm wants to enter into a new territory, it is essential that it conducts market research in the new region to understand the mind set of customers, what their product choices are and whether are open to accept new products. The process of research involves the following steps—problem definition, research design, data collection, data analysis and interpretation. Knowledge of managerial economics coupled with research knowledge and statistical techniques of problem solving helps a manager in understanding, interpreting and evaluating different variables.

Managerial economics helps decision makers to understand the impact of the decisions they take on daily basis. Economic analysis helps the business in determining the best path to achieve more profits. For instance, if the company is affected by poor sales and the company is keen to increase its profit element, there may be a suggestion by a manager about price reduction which may result in higher sales. If the product is a commonly consumed product and a necessity good, this action by the firm will definitely increase sales volume. However, a thorough economic analysis has to be undertaken before deciding upon the percentage of price decrease.

Majority of the managerial decision making is based on the following aspects :

What to Produce?

What goods should be produced to satisfy consumer wants is directly dependent on the limited resources available. A country producing goods that maximises consumer satisfaction is said to be allocatively efficient. Economies should decide the best combination of goods and services to meet their needs. For example, they must decide on (a) how much resources should be allocated for consumer goods, and much resources to capital goods, or (b) how much resources should go towards education, how many towards health, defence, etc.

How to Produce?

Combining production inputs to produce the goods decided above in the most efficient manner is the second problem faced by firms. An economy achieves productive efficiency if it produces goods using the least resources possible. Societies should decide the best combination of factors to create the desired output of goods and services. For example, decisions regarding how much land, labour, and capital should be used produce consumer goods such as computers and motor cars should be taken.

For Whom to Produce?

The demographics or the structure of the population of a country decides the actual production of goods. Firms have to decide whether to produce the high income group requirements or the low income wants. A nation addressing this problem is said to have obtained pareto distribution efficiency.

All the above decisions involve proper allocation and utilization of scarce productive resources, namely, land, labour, capital and enterprise. Decisions about resource allocation should be made in three stages:

- **Allocative decisions:** Decisions regarding the types and quantities of goods to be produced from the available productive resources. This requires devising ways and methods to mobilize resources in the desired direction.
- **Productive decisions:** Decisions as to who will produce and where are they produced to satisfy the consumers wants. Production function requires choice of right techniques. When to produce and where to produce are also production related decisions.
- **Distributive decisions**: Decisions as to how the goods are to be distributed. An economic system chalks out its own course of distribution arrangement.

Business activity is therefore concerned with the right use of scarce productive means. Optimum utilization of resources involves a choice between what, how, when, how much and for whom to produce. Prof Halm summarizes the basic problem of all economic systems as the allocation of scarce means among competing ends for the achievement of maximum results.

1.5 SCOPE OF MANAGERIAL ECONOMICS

Managerial economics is the application of economic concepts. It is the economic analysis of problems to help make rational decisions. It is the integration of economic

principles with business practice. The study is pragmatic and an analytical tool useful for decision making in business.

Managerial economics helps in two major functions—(a) it helps managers in decision making and (b) in business forecasting and forward planning. These functions are to be performed under conditions of uncertainty. The following points throw more light on these:

1. **Strategic Planning:** Managerial Economics provides a framework on which long term decisions can be made which have an impact on the behavior of the firm. The perspective of strategic planning is global. The integration of business economics and strategic planning has given rise to a new area of study called 'Corporate Economics'.
2. **Resource Allocation:** Scarce economic resources are to be used with great efficiency to get the best results from a production process.
3. **Inventory and Queuing:** Inventory decisions require decisions about the right quantity of stocks of raw materials and finished goods to be kept over the period. These decisions are taken considering the market situation, availability of proper supplies, etc. Queuing problems involve decisions relating to installation of machines and hiring of the right number of labour across the different categories of skilled, semi-skilled and unskilled work force.
4. **Pricing Decisions:** Fixation of prices for the firm's products is an important decision making problem. Pricing decisions require assessment of various pricing techniques and choosing the best one. Competitor analysis of pricing procedures, the degree of competition, advertising strategies adopted by others all play a major role in fixing the firm's products.
5. **Investment:** Forward planning necessarily involves investment problems. Investment in new machineries for future expansion requires a good deal of calculations and assessment of situations. How much to invest, sources of funds, interest rates charged on such funds, continuation or discontinuance of existing product line, taking up new ventures are some of the investment problems that are addressed by managerial economics.
6. **Demand Analysis and Demand Forecasting:** One of the important requirements of modern business is correct analysis of demand. Demand elasticities help decision makers to identify the correct pricing technique for their products. The demand for a firm's products is dependent on a number of factors like the price of the product, prices of substitutes and complementary products, consumers' incomes, their tastes,

preferences and habits, population, etc. These determinants help in forecasting the future demand for the product.

7. **Cost Analysis:** Cost analysis helps in determining the size of the firm, volume of output and factors of production. A study of economic costs is necessary to evaluate the net profits. Economic costs include (a) explicit costs which involve money payments such as administration expenses and marketing expenses and (b) implicit costs which do not involve payments such as use of own premises and managing the business personally.
8. **Profit Analysis:** The incentive of firms to work and move ahead is the lure of profits. Controlling costs and adoption of right pricing policies are essential to assess a firm's profit levels. As firms work under conditions of uncertainty, like demand fluctuations, competitors strategies, technological changes, variations in methods of production, etc., it is essential that firms take right decisions at the right time. Managerial economics helps them to take appropriate decisions.
9. **Capital Budgeting for Investment Decisions:** Any factor which is scarce is expensive. Under conditions of uncertainty as discussed above, it is essential that managers take capital investments decisions with utmost care and diligence. Capital budgeting decisions involve huge amounts of money flows and therefore it is very important that right decisions are taken. A wrong move by the firm will cost a fortune to the company. Capital budgeting proposals require proper evaluation of various alternative project proposals, choosing one which suits the company's objectives and correct and optimal capital allocation. Proper evaluation and choice can be done using managerial economics.

Besides the above strategic areas where managerial economics plays a prominent role, the following other areas are also dealt with.

- Marginal analysis
- Break even analysis
- Cost of capital
- Mergers and Acquisitions

1.6 FUNDAMENTAL ECONOMIC CONCEPTS

The following economic concepts are fundamental to business analysis and decision making:

1. Opportunity cost
2. Optimization or the equi-marginal principle
3. Incremental principle
4. Time perspective
5. Discounting principle

1. Opportunity Cost

Economics deals with choosing one alternative amongst various alternatives. All the alternatives are prioritized and ranked before a particular alternative is chosen which is the top most in the priority list. This implies that the other alternatives are sacrificed. The cost of the project chosen is evaluated in terms of the sacrificed alternatives. A decision is cost free if no sacrifice is involved.

For example : A businessman may invest his own money into his business venture. The opportunity cost can be measured in terms of the interest he would have earned had he invested it in a bank. He compares the expected returns or the prospective yields and concludes that they are greater than the rate of interest and therefore he decides on investing the money in his business. Similarly, a person may take care of all the activities of his business instead of recruiting others. The opportunity cost here is measured in terms of the salary he could have earned had he worked elsewhere. He will continue to run his business as long as he is earning sufficient profits which are equivalent to the salary he would get if he worked for another firm. When he is not continuing to get normal profits, he will close down his business and work outside for a salary.

2. Equi-Marginal Principle: The equi-marginal principle is very significant in determining optimal conditions for resource allocation. This principle states that a factor input should be employed in different activities in such a proportion that its value of marginal product is equal to all the uses, thus ensuring that the optimum level is achieved. For example, symbolically, marginal productivity of labour can be expressed as MPLa = MPLb = MPLc where MPL is marginal productivity of labour. Likewise, for cost minimization the equi-marginal principle can be expressed as MC1 = MC2 = MC3 where MC is marginal cost. For revenue maximization, it is MR1 = MR2 = MR3 where MR is marginal revenue.

A manager can maximize revenues or minimize costs, both of which result in higher profits. This is referred to as the optimization technique. A manager would equate the marginal cost with marginal revenue which would result in maximization of total profit. The total profits of a firm are maximized when the difference between the total revenue (TR) and total cost (TC) is maximum. As profit = TR-TC, firms aim at increasing revenues while minimizing costs.

3. Incremental Principle

Estimating the impact of decision alternatives on costs and revenue and studying the changes in total cost and total revenue resulting from changes in prices, products, procedures, and investments is the incremental concept. Incremental analysis includes two concepts: incremental cost (IC) and incremental revenue (IR). IC is the additional cost incurred for additional output. In other words, it is changes incost due to changes in level of output.IR is the additional revenue from additional output or the changes in revenue due to changes in output. In order to determine whether thedecision is sound or not we should compare the IC and IR of every decision.For everybusiness decision, there is IR and IC.If IR exceeds the IC, or IR is equal to IC the decision can be assumed as a sound decision.

On the basis of the incremental analysis, a manager would like to implement the business action which is profitable. A decision is obviously a profitable one if:

- It increases revenue more than costs
- It reduces costs more that revenues.
- Itdecreases some costs to a greater extent than it increases other costs
- It increases some revenues more than it decreases other revenues

Some businessmen hold the view that to make an overall profit, they must make a profit on every job. Consequently, they refuse orders that do not cover full cost (labour, materials and overhead) plus a provision for profit. Incremental reasoning indicates that this rule may be inconsistent with profit maximisation in the short run. A refusal to accept business below full cost may mean rejection of a possibility of adding more to revenue than cost. The relevant cost is not the full cost but rather the incremental cost.

4. Time Perspective

Managerial economists widely use the functional time periods, short run and the long run, and their effects of decisions on revenues and costs. One important problem in decision making is maintaining the right balance between the long run and short run

considerations. For example, let us say there is a firm which does not utilize its capacity to the optimum and has some idle capacity. It gets an order for 50,000 units at a rate of 4 per unit. The production experts calculate that the short run incremental cost(ignoring the fixed cost) is 3. The order's contribution to overheads and profit is 1per unit (Rs.50,000/- for the entire order). When we analyse this case, the following long run repercussions of the order is evident:

1. If the management commits itself with too much of business at lower price or with a small contribution, it will not have sufficient capacity to take up business with higher contribution.

2. If the other customers come to know about this low price, they may demand a similar low price. Such customers may complain of being treated unfairly and feel discriminated against. The firm risks of losing such customers to their competitors. In the above example it is therefore important to give due consideration to the time perspectives. A decision should take into account both the short run and long run effects on revenues and costs and maintain the right balance between long run and short run perspective.

Short term time perspectives are based on short run analysis of the business performance. Seasonal fluctuations are bound to happen and variations in business occur. For example, sales of crackers are high and the demand occurs only during the Deepavali season. A banker has to keep large amounts of liquid cash to meet the heavy withdrawals in the first week of every month. Shops selling school uniforms and school shoes witness huge sales in the beginning of the academic year. In all such cases, inventory management is based on short-term business perspectives. However, in the long run, a business' emphasis is more on growth, development and expansion. Long run planning plays a crucial role in busness. External influencing factors are to be considered. For instance, due to the economic progress and rise in salaries in the country, there are a large number of people visiting places. Businesses in the airline industry and road transport witness increasing number of travellers which is expected to continue in future also. To meet this ever-increasing demand, these firms should have long term plans such as increasing the fleet, replacement of old vehicles, etc.

5. Discounting Principle

One of the fundamental concepts in Economics is that the present value of money is greater than the future value. A rupee tomorrow is worth less than a rupee today. Thus, in investment decision making, discounting the future value with the present value is very essential. All the future costs and revenues are discounted to bring them to the present values before a comparison between alternatives is possible and a decision is taken. The following

formula is used to discount the future value:

PV = A/(1+i), where PV is the present value, A is the amount and i is the rate of interest.

For example, if A is 1,000, i is 12%, the present value can be calculated as 1,000/(1+0.12) which is equal to 893. Tomorrow's 1,000 is equal to today's 893.

1.7 RELATIONSHIP TO THE FUNCTIONAL AREAS OF BUSINESS AD MINISTRATION

Economics can be applied to several disciplines of management such as:

1. Production Management
2. Marketing
3. Finance
4. Human Resource Management
5. Operations Research

1. Economics and Production Management

A production manager has to take decisions regarding what to produce, when to produce, what quantities to produce, how to produce, how to increase productivity, etc. For all these questions, optimal utilization of available resources is important. Economics deals with production functions such as production process, input-output analysis, cost-benefit analysis, inventory management, pricing policies, etc. which are all considered to have relevance and significance in production management.

2. Economics and Marketing

Manufacturing and marketing are inter-related. Businesses are successful only if the marketing efforts are efficient and bring in sales, that is, whatever is manufactured is sold. Marketing operations of a business are based on consumer behaviour and market demand. Demand analysis and forecasting is an important function of economics. Demand function and elasticities of demand help marketing staff to analyse the effects of various pricing strategies on the sales function. Product differentiation, advertising strategies, decisions involving expansion of business into newer territories, effect of closing down of some products are some other areas where economics can contribute to.

3. Economics and Finance

Finance is a very important function of a business. A firm's continuance or discontinuance depends on the financial flows. Financial management determines the stability

of a firm. Right decisions regarding capital budgeting, investment allocation, inventory issues, depreciation methods, methods of raising capital, interest payments, cost of capital, cash flow management, etc. are very important for the success of a business. Accounting ratios such as net profit ratio, return on investment, price-earnings ratio, and financial ratios are all a part of economic analysis of the firm.

4. Economics and Personnel Management

Human resources are very important for enhanced productivity. Wage payments to labourers, salaries to office staff, perks and fringe benefits to employees have an economic bearing. Labour economics plays a vital role in any organization. Selection and recruitment policies, training, replacement policies are some personnel issues which have a bearing on a firm and are assessed by labour economists. Formulation of wage policy, bonus and incentive plans, training, promotion programmes are based on the efficiency of production process and sales efforts.

5. Economics and Operations Research

Operations research is an integral part of decision making process working towards firm's optimization. Optimization is the art of economizing. Operations research is the application of statistical and economic analysis to solve business problems and to arrive at rational decisions. It is useful in solving diverse business problems like production scheduling, distribution management, advertising budget in different market segments, etc.

1.8 OBJECTIVES OF FIRM

The goals or objectives of a firm are classified into two types—(a) normative goals and (b) descriptive goals.

Normative goals :

It suggests how a firm should act under a given set of values. For instance, how to make the most efficient use of economic resources. Normative objectives advocate what is right and wrong, what ought to be done and not in a given situation. These objectives are based on ethical values and are suggestive in nature laying down which is a better course of action for a firm to adopt. If a company decides to introduce a new product into the market, it has to decide if it has to adopt skim the cream pricing policy wherein it charges high prices initially when the product is introduced and makes quick profits or adopt penetration pricing where in it charges lower prices initially to get people's acceptance. Normative objectives encompass value judgment. All firms lay out normative objectives first. Managerial economics deals with the normative aspects of the firm.

Descriptive objectives :

Descriptive objectives also known as positive objectives are decisions made to achieve the normative objectives of a firm. Managerial decisions usually involve one major question—resource allocation. Resource allocation is to be done adequately and properly both in the short run and long run. Short run decisions are different from long run decisions. In the short run, managers give more importance to demand estimation, production and to pricing policies. In the long run, decisions are made to meet expansion plans, developing new products, entering new territories, etc. These decisions are more of capital budgeting in nature. Managerial economics helps one in understanding the various criteria for carrying out these strategies.

Motives of firm

A firm may have any one or a combination of the following objectives:

1. Profit maximization in the short run and/or in the long run
2. Shareholders' wealth maximization
3. Growth of the firm
4. Sales maximization
5. Long run survival
6. Maximizing social welfare

1. Profit Maximization Objective

Profit is the incentive that an entrepreneur gets for taking the risk of running a business. Every firm looks for maximizing profits and this is a very important motive for a firm to be in the manufacturing or marketing or service business. Profit motive plays an important role in the efficient allocation of economic resources.

Pure or above normal or economic profits are defined as the difference between total revenue or sales receipts and total economic cost of production and promotional cost. Economic costs include both explicit and implicit costs. Economic profits are above abnormal or super normal profits. Profit is the prime motive that determines the quality and type of goods to be produced and sold.

Accounting or Business Profits and Economic Profits

Economic profits are arrived at after the inclusion of both explicit and implicit costs whereas accounting profits are calculated after consideration of explicit costs only such as payment of salaries, rent, interest, marketing expenses, etc. and by not considering implicit

costs like cost of self-owned funds, running the business from company owned premises, owners taking care of business operations instead of hiring outsiders, all of which have no contractual payments are excluded from the computation of accounting cost. Accounting profits are therefore high and give an inflated picture about the business. Managerial economists mean economic profits which gives a true picture of the profits in economic sense.

Normal profit and super normal profits

Profits are the difference between total revenue and total economic cost. A businessman in any type of business expects a minimum rate of return on his investment. This rate of return is the main attraction for him to take up the risk of starting a business. The normal profit is necessary to induce individuals to invest funds and undertake a business activity. It is the cost of capital and a return for the risk taken. It is therefore a part of the total cost of production. Normal profit may be defined as the minimum rate of return sufficient enough to induce a firm to stay and continue in the industry.

Supernormal Profit:

Anything above the normal profit is abnormal or supernormal profit. If a firm gets a higher rate of return than the average cost of production which includes normal rate of profit, the higher rate of return over and above the normal profit is called "Supernormal profit". It is the difference between the average revenue and average cost of production.

2. Shareholders' Wealth Maximization or Value Maximization Objective

A firm can have its objective as shareholders' wealth maximization, which is, maximizing the market value of the firm's stocks. The shareholders' return on investing in a firm is the dividends. The shareholders' value is maximized when the present value of the firm's expected future net earnings are high. The present value of the firm is obtained by discounting the sum of all future earnings which will be distributed as dividends at the required rate of return. While calculating the required rate of return to calculate present value of future earnings, it is necessary to adjust for the differential risk levels involved in the business over the life of the project.

3. Growth Maximization Objective

Increasing sales, having a bigger market share, larger asset base, growing number of employees are all indicators of a rising and growing business. Individuals and shareholders derive pride and satisfaction to be associated with such businesses and are happy when these firms reach greater heights. Employees of such organizations receive handsome salaries

and better perks and are therefore happy. A happy employee is a highly productive employee and the quality of products of such companies is good and therefore is demanded more in the market, all of which increases sales.

4. Revenue Maximizing Objective

William Boumol introduced the revenue maximizing objective. Managers of some firms are interested in maximizing total revenue to maintain the firm's competitive position in the market. Firms deem it a matter of prestige to be at the number one slot in the industry. This position in many cases is decided on the revenues of firms. Another reason why managers look at maximizing revenues is that many a time, their salaries are linked to the firm's total turnover, that is, revenue rather than on profits.

5. Long run survival

A firm looks at long run survival to maximize its probability of more profits. Decisions therefore centre round such issues and requirements that are long term in nature. However, by facing tough competition and surviving in the short run only ensures that the firm is able to pull on into the future. Managers do not prefer to be associated with short lived firms. To achieve the long term survival objective, business decisions are made in such a way that risks are avoided or minimized.

6. Social Responsibility of Business

A business enterprise contributes greatly to social welfare. Firms cater to the needs of the society. Maximizing consumers' welfare is the most important goal of many firms as managers of such firms realize that profits, value, wealth, sales maximization long term survival are all dependent on this objective. Besides manufacturing and selling goods that customers demand, firms also take interest in social activities like laying roads, providing drinking water facilities to public, beautification of parks, etc.

1.9 SUMMARY

Business decision making is a complicated process as businesses have multiple goals and there is no certainty in business due to their dynamic nature.Managerial economics helps decision makers to understand the impact of the decisions they take.Most managerial decisions are to be taken under conditions of uncertainty. The uncertainty is reduced to a certain extent if a detailed and exhaustive investigation is taken up and managerial economics plays a key role in the process.

There is a close link between managerial economics and other areas of business such as finance, marketing, operations and human resources.

There are many objectives that firms can pursue. The objectives are both long term and short term in nature. Different firms pursue different objectives at different times. However, profit and wealth maximization are the two most important objectives of many firms. This unit serves as an important background to the study of managerial economics. It haspresented the basic definitions of profit, both in business accounting and economic terms.In accounting terms, profit has been defined simply as the difference between revenuefrom sales and explicit or out-of-pocket costs. In economic terms, profit was defined asthe return over and above the opportunity costs, that is, the income expected from thesecond alternative investment or use of business resources.

1.10 KEY WORDS

Managerial Economics: Helps managers in decision making and forward planning. It is the application of economic concepts and economic analysis to the problems in formulating rational managerial decisions

Profits: Difference between total revenue and total cost

Motives: Objectives based on which decisions are taken

1.11 QUESTIONS FOR SELF STUDY

1. Managerial economics is an integration of economic theory and business management. Discuss.
2. Explain the scope of managerial economics
3. What are the important objectives for a firm to continue its business?
4. Differentiate between accounting and economic profits.
5. If you are an owner of a small firm, what would be your objectives? Justify your answer.
6. Do the goals of not-for-profit organizations differ from those of private sector firms? Explain.

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UNIT - 2 : DEMAND ANALYSIS

STRUCTURE

2.0 OBJECTIVES

After studying this unit, you will be able to ;

- Understand the meaning of effective demand
- Explain the law of demand
- Recognize the determinants of demand
- Formulate demand function for various products

2.1 INTRODUCTION

Demand is one of the crucial requirements for the existence of any business enterprise. A firm's sales and profit depend on the demand for their products. In a layman's language, demand is the desire or want for something. In Economics, demand refers to the effective demand, that is, the amount the buyers are willing to purchase at a particular price at a particular period of time. Demand is the desire backed by 'willingness' and 'ability' to pay for a commodity. The ability to pay is affected by factors such as income, savings and price. The willingness to pay is influenced by factors like taste, preferences and price. One may have the ability to pay, but may not be willing to pay because of not liking the product. For example, a person may have the ability to buy a 2 wheeler, but may not do so as his preference may not be a 2 wheeler, but to own a 4 wheeler.

The concept of demand is discused below:

1. **Demand is the desire or want backed by money**: Demand is defined as the effective desire or want for a commodity, which is backed up by ability (ability refers to the purchasing power or money) and willingness to pay for it. A person with no source of income wanting to own a Honda City car does not constitute potential demand as he has no ability to pay for it. Demand = Desire + Ability to pay + Willingness to spend
2. **Demand is always related to price and time**: Demand is a relative term and not an absolute term. Demand for a commodity should always have a reference to price and time. For example, an economist would say that the demand for rice per week per household is 5 kgs at a rate of 50 per kg.
3. **Demand may be ex-ante or ex-post**: Demand for a commodity may be viewed as ex-ante, that is, intended demand or ex-post, that is, what is already purchased. The former refers to the potential demand, while the latter refers to the actual quantity purchased.

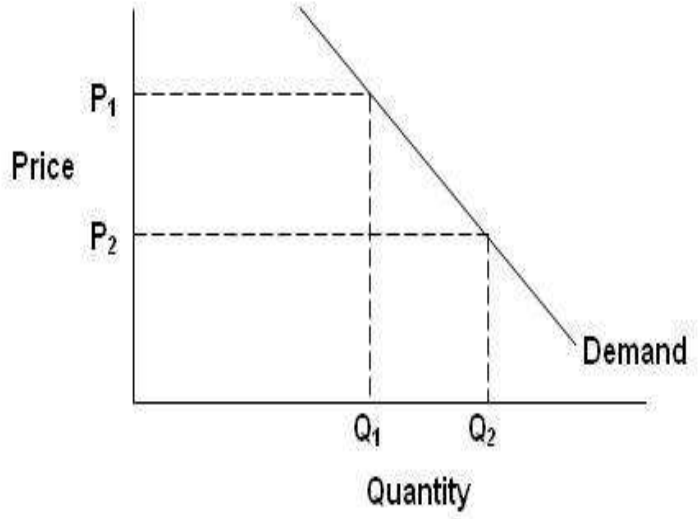
2.2 LAW OF DEMAND

The law of demand states that, "ceteris paribus(other things remaining constant),as the price of a good or service increases, consumer demand for the good or service will decrease, and vice versa". The quantity demanded and the price of a commodity is inversely related. If the income of the consumer, prices of the related goods, and preferences of the consumer remain constant (ceteris paribus, all other things being constant), then the change in quantity of good demanded by the consumer will be negatively correlated to the change in the price of the good.

Demand Schedule: The demand schedule is a table of the quantity demanded of a good at different price levels.Given a price, it is easy to determine the expected quantity demanded.This demand schedule can be graphed as a demand curve on a chart having the Y-axis representing price and the X-axis representing quantity.

Table 1 depicts the demand schedule and the Fig 1 shows the graphical representation

Price of Apples (in Rupees)	Quantity of apples demanded (Kgs)
50	5
60	4
70	3
80	2
90	1



A demand curve represents a functional relationship between price and quantity. In general, demand curves slope downward from left to right. The horizontal axis, X-axis measures the quantity demanded and vertical axis, Y-axis measures price. This denotes that consumers prefer to buy less at a higher price and more at a lower price.

DEMAND FUNCTION

The quantity of a product demanded by customers depends on a number of variables which in technical terms is known as demand function. Mathematically, a demand function establishes a functional relationship between the demand for the product and its various determining variables.

Symbolically, it is represented as: Dx = f(Px, Ps, Pc, Yd, T, A, N, e)
Dx is the demand for the product x
Px is the price of the product itself
Ps is the price of the substitute good
Pc is the price of the complementary good
Yd is the level of disposable income with the buyers
T is change buyers' tastes and preferences
A is the advertisement effect on the product
N is the change in population
e is any other factor which may influence demand

Demand function is as complex phenomenon. The amount demanded is a function of many determinants. Utmost care is required to identify the key factors which are likely to influence the demand of a product. By demand function, economists mean the entire functional relationship, that is, the entire price-quantity relationship and not just the amount demanded at a given point of time.

2.3 INDIVIDUAL DEMAND AND MARKET DEMAND

Demand schedule is a statement which indicates the price-quantity relationship. It relates the amount a consumer is willing to buy corresponding to a price. There are two types of demand schedule—(a) individual demand schedule and (b) market demand schedule

Individual Demand Schedule

It is a tabular statement showing the various amounts of quantity purchased by an individual at different prices in a particular period of time. The following are the characteristics of the individual demand schedule

1. It does not indicate changes in demand by an individual; it is just an expression of his

behaviour in purchasing the commodity at alternative prices.

2. It shows the variation in demand at varying prices
3. It shows an inverse relationship between price and quantity demanded. More will be demanded at lower prices and less will be demanded at higher prices.

Table 1 gives a hypothetical demand schedule of an individual for the product, apples.

Price per kg. of apples	Amount demanded per week in kgs.
100	2
90	4
80	6
70	8
60	10

Market Demand Schedule

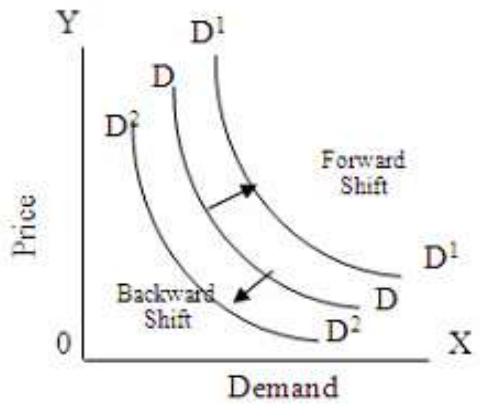
A market demand schedule represents the total market demand for a product at various prices. It is the sum total of all individual demand representing the total demand for the commodity at various prices. Let us assume that there are 3 customers in particular market for apples. Table 2 gives the hypothetical demand schedule of market for the product, apples.

Price in in Rupees	Amount demanded per week			Total market demand = A+B+C
	A	B	C	
100	2	4	6	12
90	3	5	7	15
80	4	6	8	18
70	5	7	9	21
60	6	8	10	24

Market demand function serves as a basis for understanding the revenue consequences of alternative output and pricing policies of the firm.

Changes or Shifts in Demand

If the demand for a product changes only because of changes in the price of the given commodity, the phenomenon is called expansion or contraction in demand. If demand changes not because of price changes but because of other factors or forces, this is a case of either increase or decrease in demand.If the demand increases, there isa forward shift in the demand curve to the right and if the demand decreases, there is a backward shift in the demand cure.



2.4 TYPES OF DEMAND

For a purposeful demand analysis of managerial decision, it is necessary to classify the goods. Policy makers are facilitated by an understanding of demand at various levels of aggregation. The different types of demand are:

Demand for Consumer Goods and Producer Goods: Goods and services demanded by consumers for final consumption and direct satisfaction of their wants and desires are called as consumer goods. Examples are food, clothes and services of doctors, mechanics. Goods which are demanded by producers in the process of production are referred to as producer goods or capital goods, for example, raw materials, tools and equipment, plant and machinery.

Demand for Perishable and Durable Goods: Perishable goods are goods which are to be consumed completely in one period and have to be replaced entirely in a later period. They have no durability and have a short life and become unusable after some time. Durable goods have a long useful life. Consumer durable goods include items like television, refrigerators, furniture, jewellery and cars. The demand for perishable goods is always immediate while demand for durable goods can be postponed.

Autonomous and Derived Demand: Goods whose demand is not tied with the demand of

other goods are known to have autonomous demand. Spontaneous demand based on the urge to satisfy some wants directly is called as autonomous demand. When the demand for a product depends on the demand for some other commodities, it is called as derived demand. By and large, there is no product whose demand is totally independent of other demand. But the degree of dependence varies widely from product to product. Thus, the autonomous and derived demand vary in degree more than in kind.

Individual Demand and Market Demand: Market demand is the summation of demand for a product by all individual buyers in the market. If a market has 1000 buyers, each buyer's demand is called as the individual demand and the sum total of all the 1000 buyers is called as the market demand. A company would be interested in the market demand for its product.

Firm and Industry Demand: Goods produced by one company is called as firm demand while goods produced by all the companies in the sector constitute industry demand. For example, demand for Sony television is firm demand and demand for all televisions of all firms in the television sector is the industry demand.

Short run Demand and Long run Demand: Short run demand refers to existing demand with its immediate reaction to changes in prices, fluctuations in income, etc. Long run demand is that which exists as a result of changes in pricing, product innovation or improvement and product promotion.

Joint Demand and Composite Demand: Demand for certain goods can be interrelated. When two goods are demanded in conjunction with each other at the same time to satisfy a single want, they are said to be joint or complementary demand. Examples are brick and sand, pen and ink, car and petrol. In all these cases, a change in demand for one commodity leads to a change in demand for the other product also. A commodity is said to be have composite demand when it is required for several uses. For example, steel is required for manufacturing automobiles, construction, railways, etc. A change in demand for the commodity by one user will affect the supplies of others and will bring about a change in its price thereby altering the demand pattern of the product.

2.5 DETERMINANTS OF DEMAND

A change in price leads to a change in quantity demanded. There is a movement along the demand curve. There are many factors influencing demand for goods and services. The factors are listed as under:

Price: Price is a very important factor affecting demand. A consumer decides to buy a

commodity keeping its price in mind. As the law of demand states, more quantity is demanded at lower prices and less is purchased at higher prices.

Income: The amount of income that buyers have and how much of the same is available to spend on a good affects the ability to purchase a good. In general, income has a direct effect on the ability to buy a good, that is, more income results in more buying. A purchaser's income determines his purchasing ability. If there is any change in the incomes of consumers, the demand for commodities also changes. For example, if consumers' income increases, they will buy more quantity of some commodities like fruits though the price of fruits do not fall. However, income can actually affect demand in two ways. For normal goods, more income means more demand. For inferior goods, however, more income means less demand.

Tastes, Habits and Preferences: Demand for many goods depends on an individual's tastes and preferences. A chain smoker's demand for cigarettes will not fall even when the prices go up. Demand for coffee, tea, tobacco, paan masala is a matter of habit. Advertising plays an important role in influencing the people's tastes and preferences.

Prices of Relative Goods: The quantity of goods demanded depends on the relative price of related goods such as, substitutes and complementary goods. Different goods satisfy the same needs of consumers and therefore, can be used to replace one another.When a want can be satisfied by alternate similar goods, they are called substitutes. Thus, if the price of one good goes up, the sales of the other rises, and vice versa. For example, some people consider tea and coffee, pepsi and coke as substitutes. The demand for one commodity depends on the relative price of its substitutes. If the prices of tea shoot up, customers switch over to coffee. If the substitutes are relatively expensive, there is more demand for the product if its price is moderately cheaper.

The demand for a commodity is also affected by its complementary goods. When two or more goods are demanded together, they are referred to as complementary goods. For example, shoes and socks, bricks, sand and cement, gun and bullets, are complementary to each other. Complementary goods have joint demand. When the prices of one complementary good fall, the demand for the other products increases. For example, if the price of cement decreases, there is an increased construction activity leading to an increase in demand for bricks and sand.

Consumers' Expectations of Future Prices: Consumers expectations of a further increase of decrease in future prices affect the present demand for a commodity. For example, a slight price rise of a commodity, consumers will buy more in the expectation of a further

price rise. When the prices fall, people expect them to decrease further and therefore, postpone their purchases.

Advertising and Promotional Campaigns: Demand may be affected favourably because of advertising and promotional campaigns. Creative advertising attracts more consumers towards the firm's product, there by rising the demand for its products. An improvement in packaging, distribution of gifts and freebies and discounts raise the demand for the product.

2.6 EXCEPTIONS TO THE LAW OF DEMAND

It is universally known that as the price of a product falls, the demand rises and vice versa. But, sometimes, there are situations when a fall in prices leads to a fall in demand and a rise in prices results in an increase in demand. The law of demand does not apply to every situation. The demand curve for such cases will be upward sloping. The circumstances when the law of demand becomes ineffective are known as exceptions of the law. Some of these important exceptions are as under.

1. Giffen goods: In the case of certain inferior goods, called Giffen goods, less quantity is demanded when the price falls because of the negative income effect and people's increased preference for a superior commodity with the rise in their real income. Some examples of such goods are bread and vegetable fat as against superior commodities like good quality rice and pure ghee. As the income levels of people rise, they shift to rice instead of bread and use pure ghee instead of vegetable fat.

2. Articles of Snob Appeal: Some commodities are demanded because of their exclusitivity. Such goods are prestige goods and have a snob appeal. They satisfy the aristocratic desire of the elite population. These goods are purchased by the upper creamy crest of the society and they use them as a status symbol. Diamonds or antique jewellery are more often purchased from the prestige point of view, the status and respect being due to their high prices. If the prices fall, the rich do not buy them as they no longer are prestige goods.

3. Veblen Effect: Some people buy only at high prices and do not buy if the prices fall. Buying goods at a higher price is a status symbol for them. This is called conspicuous consumption and this theory was developed by Thorustein Veblen. Buying costly goods when their prices rise show the amount of prestige owners have in owning such goods. For example, watching movies in multiplexes with special seats, travelling in executive class in aircraft, watching special entertainment programs are considered to add esteem to a person's social stature.

4. Speculation: When people speculate about changes in the price of a commodity in

future, they may stock goods. When people are convinced that the price of a commodity will rise further in the near future, their current demand will increase. They hoard goods. The recent onion price increase was more due to the hoarding by traders in the hope that the rising trend would continue and they would be able to make more profits at higher prices if they released goods to the market later.

5. Consumers' Psychological Bias or Illuison: when a customer is wrongly biased against the quality of a commodity with the price change, he may contract this demand with a fall in price. It is generally observed that rich people do not buy in a stock clearance sale which is at reduced prices as they are under the presumption that the goods may be of bad quality.

6. Irrational Demand: Irrational demand is neither a planned nor a calculated move of the purchaser. It occurs due to a sudden surge in the whims and fancies and urges of customers. There is no special purpose behind the purchase. For example, sometimes customers buy clothes seeing a display to satisfy their likings and whims and fancies though they did not have any intention of buying clothes when they stepped out for shopping.

2.7 FACTORS INFLUENCING MARKET DEMAND

Price: Market demand for a product will be high when prices are low and vice versa.

Distribution ofWealth in the Community: The market demand for commonly used products tends to be greater if there is equal distribution of income and wealth in the community than in the case of unequal distribution.

Income: As people's income rises demand for goods and services rise too. Goods which obey this rule are called - Normal Goods. However, exceptions to this are inferior goods. Demand for inferior goods decrease as income rises. If margarine is considered an inferior good, as income rises, people will switch to butter. The distribution of incomes will have an effect too on the demand for products.

Community Habits and Preferences: The market demand for a product is greatly influenced by the scale of preferences of the buyers in general. For example, a particular community may be totally vegetarian. The market demand from this community will only be for vegetarian products.

General Standards of Living and Spending Habits of People: When the population in general adopt a high standard of living and are ready to spend more, demand for durable and luxury items tend to increase.

Growth in Population: The size of market demand for a product depends on the number of

buyers in the market. The size and make-up of the population affect demand. If there is a growing population more food is demanded. If the population is stable but is ageing (like in Japan) there will be an increase in demand that old and aged people need, like increased demand for health care services.

Age Structure of Population: Age structure determines the market demand for many products. If the population of a country has more of young college going youth, the demand for education services will be high. Similarly, sex ratio of population has an impact on the demand for products. If the sex ratio is skewed and has more males than females, the demand for goods required by men like motorcycles, will be high.

Future Expectations: If buyers in general expect the prices of a commodity to rise in future, the current market demand will be more as many of them buy in huge quantities and hoard the product. On the other hand, a future fall in prices is expected to result in a decreased demand currently.

Tax Structure: A high tax rate would mean a low demand for goods in general and vice versa. A low taxed commodity will have a relatively higher demand than an untaxed commodity.

Inventions and Innovations: Introduction of new goods and substitutes as a result of inventions and innovations adversely affect the demand for existing products. For example, the introduction of mobile phones completely affected the demand for pagers. Likewise, the demand for floppy diskettes are nil with of the invention of other storage devices like CDs, DVDs and pen drives.

Fashions: Market demand for many products is affected by changing fashion. The demand for tee-shirts is very high with young college going crowd and is based on current fashion amongst youngsters.

Climate or Weather Conditions: Demand for certain products are determined by climatic or weather conditions. For example, the demand for cool juices and air conditioners increase in summer. Similarly, the demand for umbrellas is more during monsoon than in any other season.

Customs, Traditions and Rituals: Demand for certain goods is determined by customs and traditions of a society. During Deepavali, the demand for diyas and crackers is very high and the demand for cakes increase manifold during Christmas.

Advertisement and Sales Propaganda: Market demand for many products is affected by the seller's efforts. Sales promotions of sellers influence demand for products. For example,

car dealers advertise big discounts on car models during the year end which brings in more customers and more sales.

2.8 CHECK YOUR PROGRESS

1. In a market system, prices are determined by
   a) Corporate executives
   b) Government bureaucrats
   c) Supply and demand
   d) Total market demand

2. According to the law of demand
   a) There is a positive relationship between quantity demanded and price
   b) As the price rises, demand will shift to the left
   c) There is a negative relationship between quantity demanded and price
   d) As the price rises, demand will shift to the right
   e) As the price rises, consumers switch their purchases to substitute goods

3. Which of the following would NOT be a determinant of demand?
   a) The price of related goods
   b) Income
   c) Tastes
   d) The prices of the inputs used to produce the good

4. If buyers expect the price of a good to rise in the future, the result is
   a) A decrease in supply today
   b) An increase in supply today
   c) A decrease in quantity demanded today
   d) An increase in demand today
   e) An increase in quantity demanded today

5. Which of the following is reflected by the downward-sloping demand curve?
   a) The price is positively related to quantity supplied.
   b) There is an inverse relationship between price and quantity demanded.
   c) There is a direct relationship between price and quantity demanded.
   d) When the price falls, buyers willingly buy less.

Answers to check your progress: 1C, 2C, 3D, 4D and 5B

2.9 SUMMARY

Demand is the desire backed by 'willingness' and 'ability' to pay for a commodity.The law of demand states that the quantity demanded and the price of a commodity are inversely related, other things remaining constant.A demand curve represents a functional relationship between price and quantity. In general, demand curves slope downward from left to right. The quantity of a product demanded by customers depends on a number of variables which in technical terms is known as demand function. There are many factors which influence the law of demand, such as, price of the product itself, price of the substitute god, price of the complementary good, level of disposable income with the buyers, change buyers' tastes and preferences, advertisement effect on the product, population, etc.

2.10 KEY WORDS

Law of demand: *Ceteris Paribus*, as the price of a good or service increases, consumer demand for the good or service will decrease, and vice versa.

Giffen goods are inferior goods which are demanded less when prices fall because of the negative income.

Veblen Effectaregoods which are bought only at high prices and are not demanded if the prices fall.

Demand function is the quantity of a product demanded by customers which depends on a number of variables.

Demand schedule is a statement which indicates the price-quantity relationship.

2.11 QUESTIONS FOR SELF-STUDY

1. What is demand function? Differentiate between individual demand and market demand.
2. Explain the demand determinants for the following products
   (a) Sony Television,
   (b) Dominos Pizza,
   (c) Mahindra 2 wheelers and
   (d) Lakme Cosmetics
3. Analyse the demand behaviour of a growing economy for household articles
4. Explain the significance of demand analysis for fixation of prices.

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UNIT - 3 : ELASTICITY OF DEMAND

STRUCTURE

3.0 OBJECTIVES

After studying this unit, you will be able to ;

- Explain the concept and measurement of price, income, cross and advertising elasticity of demand
- Describe the determinants of demand elasticities
- Identify the importance and application of demand elasticity

3.1 INTRODUCTION

The law of demand states that with an increase in the price of goods, the quantity demanded decreases, other things remaining constant. With this definition, one can understand the direction of change in the demand for a given change in price and not the magnitude of change. If firm can know both, the direction and magnitude of change, it will help in decision making. In Economics, elasticity is defined as the ratio of incremental percentage change in one variable with respect to an incremental percentage change in another variable. The concept of elasticity has a wide range of applications in Economics. An understanding of elasticity is useful to appreciate the responses of demand and supply in a market.

Changes in product price, customers' incomes, competitors' product prices, complementary product prices, advertising outlay of the firm, customers' price expectations have considerable impact on the demand of the firm's products. The degree to which these changes affect the demand is called as "Elasticity of Demand". From a decision-making perspective, a firm would be interested to know the effect of changes of any independent variable in the demand function on the quantity demanded. A firm being able to measure the impact of changes in these variables on the quantity demanded can have effective demand forecasting.

Elasticity of demand is defined as the responsiveness or sensitiveness of demand to a given change in the price of a commodity. It refers to the capacity of demand either to stretch or shrink to a given change in price. Elasticity of demand indicates a ratio of relative changes in two quantities.ie, price and demand.

In view of its importance to decision making, economists consider three important kinds of demand elasticities:

- Price elasticity of demand
- Income elasticity of demand

- Cross price elasticity of demand

3.2 PRICE ELASTICITY OF DEMAND

The extent of responsiveness of quantity demanded of a product to a given change in price is known as the price elasticity of demand. Price elasticity measures the ratio of the relative change in demand and price variables. The coefficient of price elasticity e_p is measured by:

e_p = Percentage change in Quantity Demanded/Percentage change in Price

Price elasticity is also represented as $(\delta Q/Q)^* (P/\delta P)$

Where Q is the original quantity demanded, Q

P is the original price

δQ is the change in demand. This is measured as the difference between the new demand, Q2 and the old demand, Q1, that is δQ = Q2-Q1

δP is the change in price. This is measured as the difference between the new Price, P2 and the old Price, P1, that is δP = P2-P1

For example, let us assume the price of oranges to be 20 and the quantity demanded in a particular market is 100 kgs. If the prices rise to 21, and the quantity demanded falls to 96kgs, the elasticity of demand is calculated as:

δQis Q2-Q1 = 96-100 = -4

δP is P2-P1 = 21-20 = 1

Elasticity is measure by$[(\delta Q/Q) * (P/\delta P)] = [(-4/100)*(21/1)] =$ **-0.8**

Owing to the inverse relationship between and price and quantity demanded, the co-efficient of price elasticity of demand is generally negative. However, economists report it as a positive number, referring to its absolute value. Ignoring the sign, elasticity of demand is less than one in the above example. One may obtain various numerical values of coefficient of price elasticity ranging between zero to infinity depending on the magnitude and proportion of change. If the price elasticity coefficient is greater than unity (e > 1), the commodity is said to be price elastic, if it is less than unity (e < 1), the good is considered to be price inelastic.

3.2.1 TYPES OF PRICE ELASTICITY

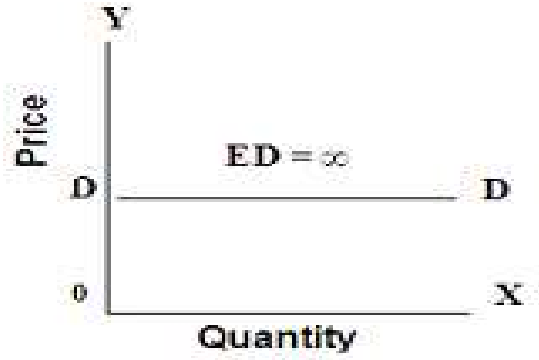
Marshall suggested the following classification of price elasticity of demand depending on the numerical coefficient.

- Unit elasticity of demand (e = 1)
- Elastic demand (e > 1)
- Inelastic demand (e < 1)

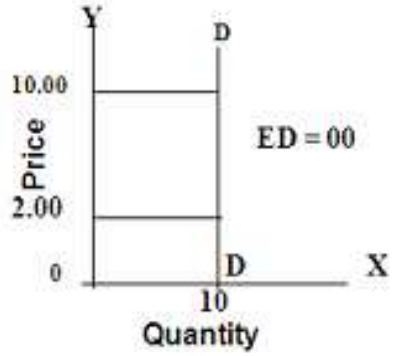
When the commodities demand responds favourably or relatively more to a price change, the demand is said to be elastic demand. When the relative change in demand is less than the relative change in price, it is inelastic demand. Modern economists have reclassified Marshall's price elasticity into the following five heads:

- Perfectly elastic demand
- Perfectly inelastic demand
- Unitary elastic demand
- Relatively elastic demand
- Relatively inelastic demand

Perfectly Elastic Demand: In a perfectly elastic demand situation, the responsiveness of demand to a change in price is infinite, thereby resulting in a flat demand curve. A slight rise in the price of a commodity results in consumers not buying it. The numerical coefficient of perfectly elastic demand is infinity. The demand curve will be horizontal to the axis for a product with perfectly elastic demand, suggesting that a slight rise in demand would mean zero demand. This is a case of theoretical extremity rarely encountered in real life.

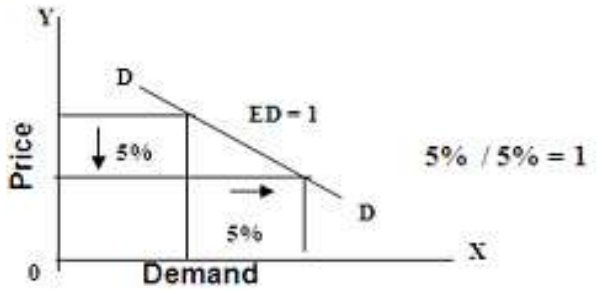


Perfectly Inelastic Demand: When the demand for a commodity shows no response to a change in price, the product is said to have perfectly inelastic demand. The demand curve is a vertical straight line and parallel to OY axis. The quantity demanded remains the same for any given change in prices. Perfectly inelastic demand has zero elasticity The demand curve is a vertical line and is parallel to axis. For example, if the price of a product falls from 10 to 2 and there is no change in the quantity demanded, the numerical co-efficient is 0.

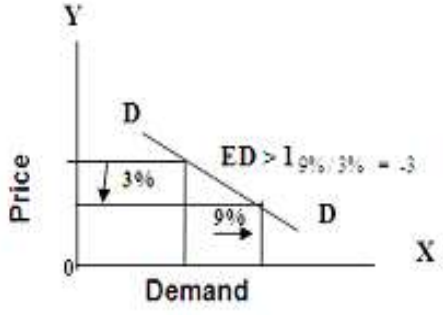


The above figure suggests that whatever the price of a commodity is, OP or OP1 or OP2, an increase or decrease in prices does not lead to an increase or decrease in quantity demanded, that is, the price remains constant. Absolute necessary products with no substitutes, like salt have perfectly inelastic demand,

Unitary Elastic Demand: When the proportion of change in demand is exactly the same as the change in price, the demand is said to be unitary elastic. Numerically, it is expressed as e = 1.



Relatively Elastic Demand: When the proportion of change in quantity demanded is greater than the change in price, the demand is said to be relatively elastic. Numerically, the value of relatively elastic demand lies between 1 and For example, if the price of a product falls by 3 % and demand rises by 9 %, the demand is said to be relatively elastic demand as the numerical co-efficient of demand is greater than one.A change in demand is more than that of change in price.



Relatively Inelastic Demand: When the proportion of change in quantity demanded is lesser than the change in price, the demand is said to be relatively inelastic. Numerically, the value of relatively elastic demand is less than 1. For example, if a decrease in the prices of a commodity of 8% leads to a 4% rise in demand, the elasticity is 4%/5% which is equal to 0.5%. The change in demand is less than the change in price and hence the demand is relatively inelastic.

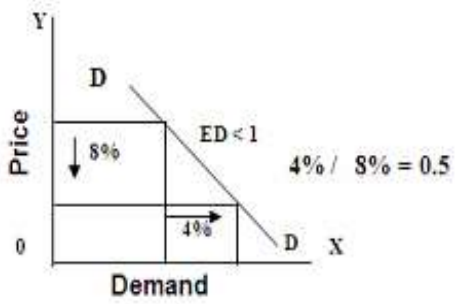
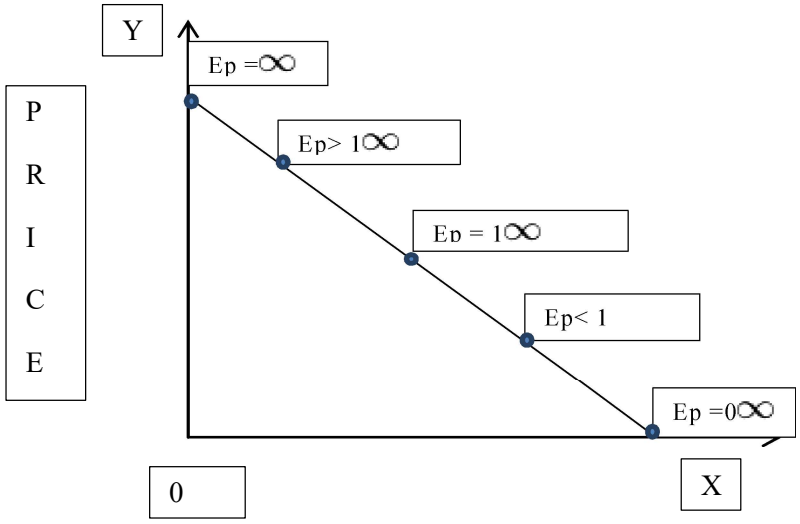


Table 1 Elasticity of Demand—Meaning and Interpretation

Numerical Value	Demand	Meaning and Interpretation
$e = \infty$		all if prices go up slightly
e = 0	Perfectly inelastic	Demand remains the same whatever is the change in price
e = 1	Unitary	Quantity demanded is exactly the same as the change in price
e > 1	Relatively elastic	Proportion of quantity demanded is more than the change in price
e <1	Relatively inelastic	Proportion of quantity demanded is less than the change in price

The following figure summarizes the different types of elasticities.



3.2.2 MEASUREMENT OF PRICE ELASTICITY OF DEMAND

There are three different methods of measuring price elasticity of demand, namely,

- Ratio method
- Outlay method or revenue method
- Point method

Ratio Method

Price elasticity is measured by the ratio between the proportion or percentage change in the quantity demanded and the proportion or percentage change in price

$$(\delta Q/Q) * (\delta P/P)$$

Where Q is the original quantity demanded, Q1

P is the original price, P1

δQ is the change in demand. This is measured as the difference between the new demand, Q2 and the old demand, Q1, that is $\delta Q = Q2-Q1$

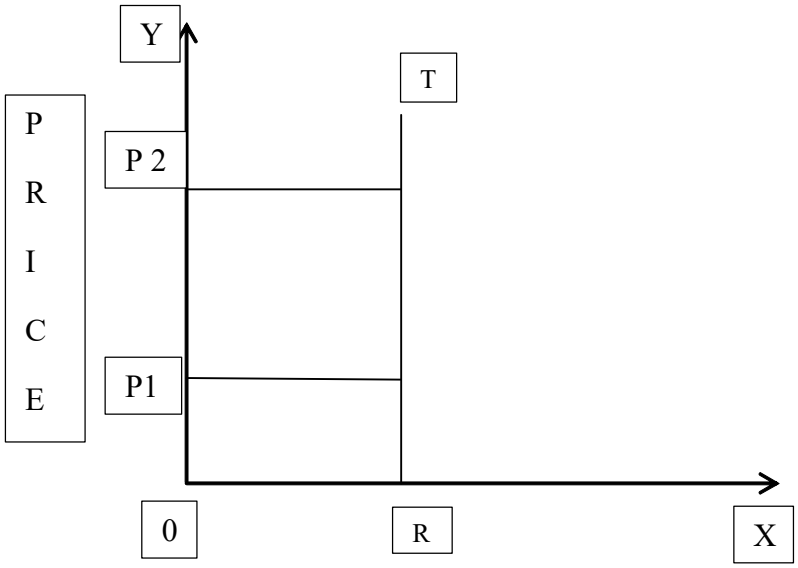
δP is the change in demand. This is measured as the difference between the new Price, P2 and the old Price, P1, that is $\delta P = P2-P1$

Outlay Method or Revenue Method

Marshall suggested that the easiest way of ascertaining whether the demand for a product is elastic or not is by examining the change in total outlay of the consumer. Alternatively, the total revenue of the seller corresponding to the change in price of the product can also be observed to determine the elasticity of demand.

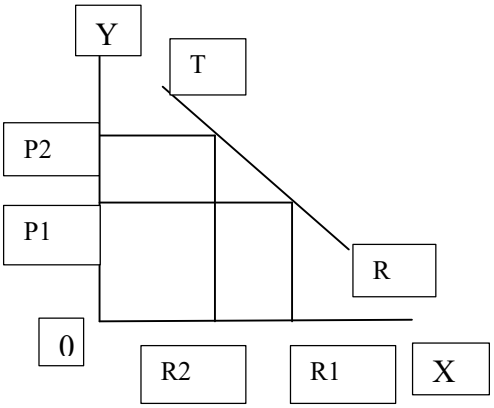
Total revenue or total outlay = (Price) * (Quantity purchased or sold)

$e_p < 1$: If the total outlay or collection of revenue remains the same as before even after a change in price, the demand is said to be unitary demand.

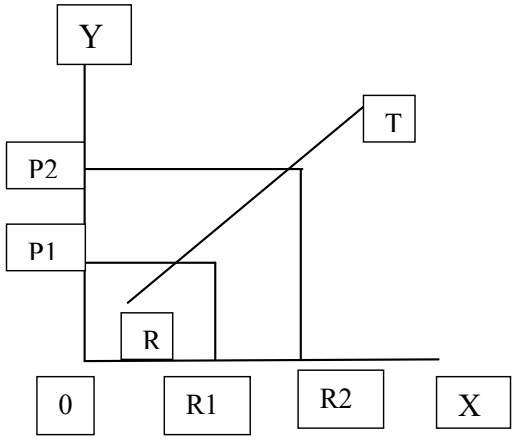


Quantity demanded

$e_p > 1$: If a small rise in price leads to a decrease in revenue, elasticity of demand is greater than unity and the product is said to be having elastic demand. When price and total outlay move in opposite directions, the demand is relatively elastic.



$e_p < 1$: If a small rise in price leads to an increase in revenue, elasticity of demand is less than unity and the product is said to be having inelastic demand. When price and total outlay move in the same direction, the demand is relatively elastic.



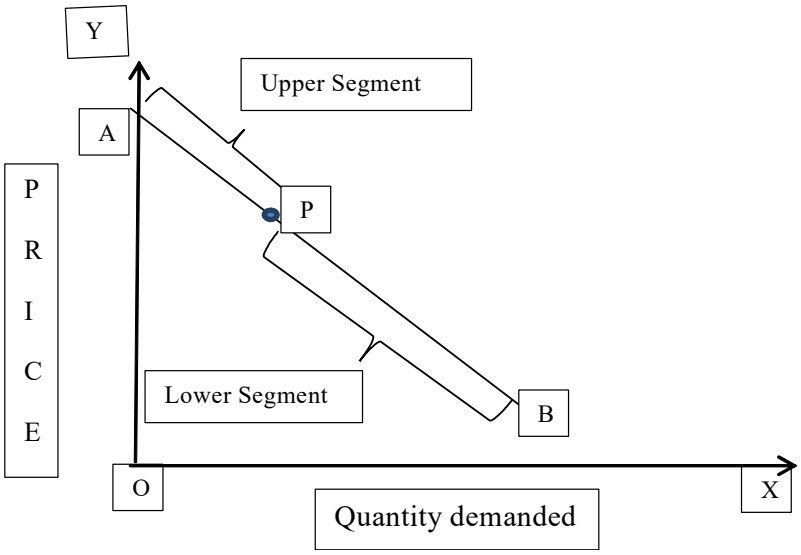
The behavioural relationship between price changes, elasticity and total revenue is summarized as follows:

Table 2: Elasticity and Total Revenue

Type of Elasticity (e)	Price	Total Revenue TR
e=1	Increases	Constant
e=1	Decreases	Constant
e>1 (relatively elastic)	Increases	Decreases
e>1 (relatively elastic)	Decreases	Increases
e<1 (relatively inelastic)	Increases	Increases
e<1 (relatively inelastic)	Decreases	Decreases

Point Elasticity Method or Geometric Method

Marshall suggested point elasticity method or the geometrical method for measuring price elasticity at a point on the demand curve. In this method, the elasticity is measured at different prices (at different points on the demand curve). A point is plotted on the demand curve, point P, which divides the curve into two segments. The point elasticity is the ratio of the lower segment of the curve below the given point to the upper segment of the curve above the point.



Point elasticity = Lower segment of the demand curve below the given point

Upper segment of the demand curve above the given point

In the figure above, e = PB/PA.

This method is called point elasticity because it effectively measures the elasticity at a point on the demand curve assuming infinite changes in price and quantity demanded.

Arc elasticity

The method discussed above help us in calculating price elasticity,ep, of demand when there is a small change in the price of the product. However, this method does not help us when there is a big change in prices. For example, if the price of a product increases from 4 to 5, the change is 25% of the old price. In such cases, 'Arc elasticity of demand' is used. While taking decisions, it is prudent on the part of the management to consider arc elasticity measure rather than the point elasticity measure.

$$e_{arc} = [(\delta Q/\delta P)] * [(P1+p2)/ (Q1+Q2)]$$

Where P1 is original price

P2 is new price

Q1 is original quantity demanded

Q2 is new demand

δp is P2-P1

δQ is Q2-Q1

Illustration

The initial price of a product is 100 and the quantity demanded is 1000 units. If the price increases to 120, the demand falls to 800 units. What are the point and arc elasticity measures?

P1 = 100, P2 = 120, Q1 = 1000, Q2 = 800, δp = 20, δQ = -200

Point elasticity at P1 is (δQ/Q)*(P/δp) = (-200/1000)*(100/20) = -1

Point elasticity at P2 is (δQ/Q)*(P/δp) = (-200/800)*(120/20) = -1.5

In this case, managers face the dilemma of classifying demand elasticity. Should they consider it to be unitary elastic or more elastic. By using arc elasticity, they arrive at the following measure:

$$e_{arc} = \frac{\delta Q}{\delta P} * \frac{(P1+p2)}{(Q1+Q2)}$$

$$(-200/20) * \{(100+120)/(1000+800)\} = -1.222$$

Arc elasticity suggests that the elasticity of demand is greater than unity.

3.2.3 FACTORS INFLUENCING PRICE ELASTICITY OF DEMAND

1. **Nature of the Commodity:** Goods can be classified under three major types—luxury goods, comfort goods and necessary goods. Luxury and comfort goods are price elastic and necessary goods are price inelastic. Demand for cars, television, air conditioners is price elastic as consumers postpone their consumption when their prices increase. On the other hand, demand for food-grains, electricity, cooking oil, etc is inelastic as these are necessities of life and are demanded by consumers at all times.
2. **Availability of Substitutes:** Demand for a good tends to be elastic when there is a close substitute available to it. This is because of the consumers tendency to buy a cheaper product. For example, demand for salt is inelastic as it does not have a substitute. The product being a necessity consumers buy the product whatever is its price. Whereas in the beverages segment, there are many cocoa products which are subsitutes to each other, like Bournvita, Boost, Chocolate Horlicks, etc. Demand is elastic as consumers shift to their consumption to other products when the price of one product increases.
3. **Consumers'Income:** Millionaires' demand for commodities is relatively inelastic. Their demand pattern is not affected by any significant price changes. Redistribution of income in favour of low income group people tends to make demand for goods elastic.

4. **Proportion of Income Spent on a Commodity:** Elasticity of demand for goods on which consumers spend a high proportion of their income is high. Because of the large amount involved on such goods, demand is sensitive. For Example, vacation travel, entertainment and recreation. If a commodity requires only a small portion of the consumers income, the demand is relatively inelastic. For example, books, pens, etc.

5. **Number of Uses of a Product:** When a commodity has several uses and its price is high, the commodity is put to the most important use first. With a fall in prices, the product is put to other uses as well. For example, demand for electricity is elastic as it has a number of uses—lighting, cooking, heating, etc. Demand for products with few uses is less elastic. If the price of a match box decreases, people will not increase their consumption as the commodity has only a specific use.

6. **Commodity's Durability:** Demand for durable goods, like televisions and refrigerators, are less elastic in the short run and more elastic in the long run. In the short period, the consumers do not think of replacing the goods they have bought whereas in the long run, they have sufficient time to enquire about a product's performance and then make calculated decisions. Hence, demand for durable goods is more elastic in the long period.

7. **Habits:** Some goods like cigarettes, pan masala are consumed more as a habit. Customers of such products buy them whatever their prices are and the demand for them is inelastic.

8. **Time:** In a short period, demand in general is less elastic, while it is elastic in the long run. This is because of the fact that it takes some time for the news of a price change to become known to the buyers. Expecting a further change, consumers may not react to changes in price immediately.

9. **Postponement of Consumption:** Consumption of goods like mobile phones can be postponed when the prices are very high. Likewise, the prices of fruits are very high in off-season which are afforded only by the rich. The average person waits for the season to set in and prices fall for consuming fruits. Demand for goods whose consumption can be postponed are highly elastic.

10. **Range of Prices:** Certain goods like luxury items, air conditioners, four-wheelers, are highly priced in general. A small change in their prices will have an insignificant effect on demand. The demand for such goods is inelastic. If the price change is large, their demand becomes elastic. Similarly, low priced goods which are purchased in bulk, like perishables, onions and tomatoes have inelastic demand. Whatever are their prices, customers consume them.

11. **Jointly Demanded Goods:** Demand for goods which are jointly demanded like car and

petrol, pen and ink are inelastic. For example, a reduction in car prices may not increase demand if the prices of petrol are increasing.

3.2.4 PRACTICAL APPLICATIONS OF PRICE ELASTICITY OF DEMAND

1. Helps in Production Planning

2. Helps in Price Fixation of Different Goods

3. Helps in Reward Fixation for Factor Inputs

4. Helps in Determining the Foreign Exchange Rates

5. Helps in Determining the Terms of Trade

6. Helps in Fixing Tax Rates

3.3 INCOME ELASTICITY OF DEMAND

Income elasticity measures the rate of change in the quantity demanded of a product to a given change in the income of the consumer. It measures the response of consumers to a product given a change in their income. It indicates the extent to which demand changes with a variation in consumers income. It is the ratio of change in the quantity demanded to a change in income.

Income elasticity = Percentage Change in quantity demanded/ Percentage Change in income or em = (% δQ) / (% δM)

$e_m = (\delta Q/Q) * (M/ \delta M)$

where δQ is change in demand

Q is the initial demand

δM is the change in income

M is the initial income

3.3.1 TYPES OF INCOME ELASTICITY

Income elasticity may be classified as follows:

1. Unitary income elasticity of demand em = 1
2. Income elasticity of demand greater than unity em> 1
3. Income elasticity of demand less than unity em< 1

4. Zero income elasticity of demand em = 0
5. Negative income elasticity of demand em< 0

Unitary Income Elasticity of Demand: When the percentage change in demand is equal to the percentage change in income, the demand is unitary income elastic. For example, a 10% increase in consumer's income brings in a 10% increase in quantity demanded.

Income Elasticity of Demand Greater than Unity: When the percentage change in demand is greater than the percentage change in income, the demand is greater than 1. For example, if the income of a consumer rises by 10% and the demand for a product increases by 14%, the product's demand is said to be greater than 1.

Income Elasticity of Demand Less than Unity: When the percentage change in demand is less than the percentage change in income, the demand is less than 1. For example, if the income of a consumer rises by 10% and the demand for a product increases by 8%, the product's demand is said to be less than 1.

Zero Income Elasticity of Demand: Zero income elasticity occurs when an increase or decrease in income has no effect on demand and the quantity demanded remains unchanged.

Negative Income Elasticity: When an increase in income causes a decrease in the quantity demanded, the demand is negative income elastic. This is a characteristic feature of inferior goods like jowar and bajra. With an increase in income, the poor tend to consume less of these products and spend more on rice and wheat.

In general, there is a positive correlation between income and demand and income elasticity generally tends to be positive. Other things remaining constant, an increase in income leads to an increase in demand and a fall in income results in decrease in demand. However, negative income elasticity can be observed in inferior and Giffen goods. With a rise in income, a consumer spends less on these goods. The elasticity of demand for durables such as home appliances and cars is high and for necessities like salt and bread, it is low.

The income elasticity is very helpful to classify commodities into various types:

1. Normal goods—income elasticity is positive
2. Inferior goods—income elasticity is negative, example, jowar and bajra
3. Luxury goods—income elasticity is positive and greater than 1, example, air conditioners and cars
4. Essential goods—income elasticity is positive but less than 1, example food grains and fuel

5. Neutral good—income elasticity is zero, example, salt and match box

3.3.2 SIGNIFICANCE OF INCOME ELASTICITY

1. Long-term Business Planning and Demand Forecasting: Demand for luxury goods and comfort goods are highly income elastic. Forecasting and forward planning and expansion can be done by anticipating changes in the income levels of consumers.
2. Market Strategy: Income elasticity of demand is helpful to devise market strategies for new products. Luxuries and comfort goods are sold in markets with high income elasticity of demand and essentials in markets with less income elasticity.
3. Taxation of Income: Luxury goods are income elastic. As the incomes increases, consumers spend more on luxuries. The government can collect more from the rich by way of higher income tax and higher levies on such products.

3.3.3 PRACTICAL APPLICATIONS OF INCOME ELASTICITY OF DEMAND

1. Helps in Determining the Growth Rate of the Firm.

2. Helps in the Demand Forecasting of a Firm.

3. Helps in Production Planning and Marketing

4. Helps to Maintain Stability in Production

3.4 CROSS ELASTICITY OF DEMAND

The cross elasticity of demand is the degree of responsiveness of a commodity's demand to a given change in the price of a related commodity. In cross elasticity, the change in price of one commodity and its effect on another commodity is considered.

Cross elasticity of demand = (Percentage change in demand for product X) /(Percentage change in price of product Y)

$e_{xy} = (\delta Qx/\delta Py) * (Px/Qx)$

δQ is change in quantity demanded of commodity X

Qx is initial demand of X

Py is initial price of commodity Y

δPy is change in the price of commodity Y

Example: Calculate the cross elasticity of demand.

$e_{xy} = (\delta Qx/\delta Py) * (Px/Qx)$

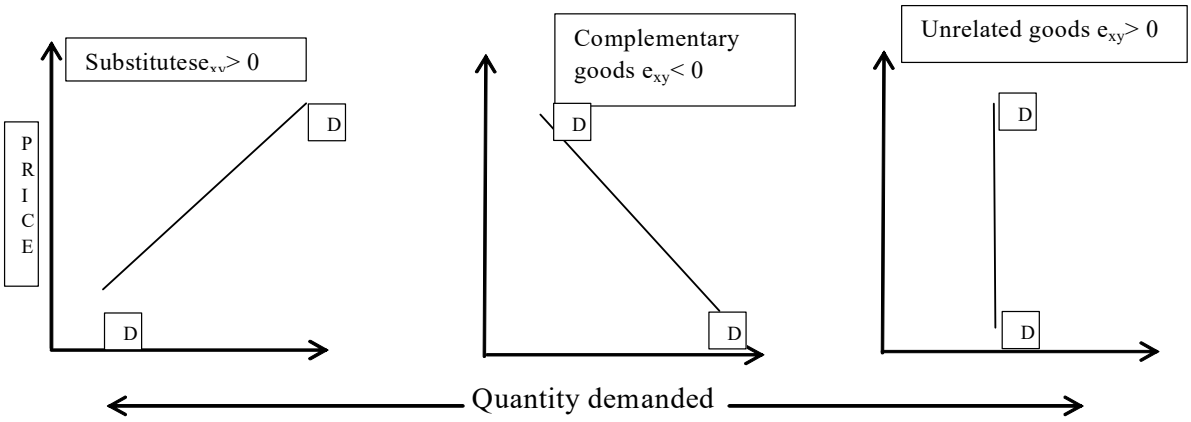
$(10/1) * (4/50) = 0.8$

The numerical coefficients of cross elasticity can be positive or negative. The following points are to be noted:

Commodity	Initial price (in Rupees)	Initial quantity demanded (cups)	New price(in Rupees)	New quantity demanded (cups)
Tea	3	50	3	60
Coffee	4	60	5	20

points are to be noted:

- Substitute goods have positive cross elasticity.
- Complementary or jointly demanded goods have negative cross elasticity.
- Unrelated goods have zero cross elasticity.



3.4.1 SIGNIFICANCE OF CROSS ELASTICITY OF DEMAND

1. It gives information about a product's response to changes in prices of other goods. This information is necessary for formulating a firm's pricing policy and to analyse the risks associated with various products.
2. It is helpful to measure the degree of competition in the market. If the price elasticity for a firm's product is high as compared to other products, there is a threat of encroachment by competitors. For example, insurance companies face a lot of

competition from other insurance companies and also in terms of products offered by them.

3. The degree of cross elasticity helps in indicating the nature of market structure, whether it is a monopoly market or a monopolistic market.

3.5 ADVERTISING OR PROMOTIONAL ELASTICITY OF DEMAND

The demand for products in the present era are influenced by advertisements. Advertising elasticity measures the responsiveness of demand to changes in advertisements or promotions.

e_a = (Percentage change in sales) / (Percentage change in advertisement expenses)

ore$_a$ = ($\delta Q/\delta A$) * (A/Q)

Where Q is quantity of sales

A is amount of advertisement expenses

δQ is change in quantity demanded

δA is change in advertisement expenses

Example

The advertisement expenditure of a company was 100000 and later raised to 120000. The sales of the company's product were initially 200000 units and with an increase in advertisement expenses, it went up to 250000 units. The advertising elasticity is measured as:

e_a= ($\delta Q/\delta A$) * (A/Q)

(50000/20000) * (100000/200000) = 1.25

3.5.1 PRACTICAL APPLICATIONS OF ADVERTISING ELASTICITY OF DEMAND

The study of advertising elasticity of demand is of paramount importance to a firm in recent years because of fierce competition.

1. Helps in Determining the Price level

2. Helps in Formulating Appropriate Sales Promotional Strategy

3.6 APPLICATIONS OF ELASTICITY ON DEMAND CONCEPT

To Businessmen :

The concept of demand elasticity is very important to a businessman in decision making like the pricing policy to be adopted. He should know the likely effect of price changes on the product's demand. He should assess to what extent a price lowering would result in demand expansion. He can know the impact of a price cut or price rise on the sales volume, total revenue and profit of the company.

If the demand elasticity of a product is more than unity, a price cut will lead to increase in sales more than proportionately resulting in an increase in total revenue. If a product has inelastic demand, there is no significant decrease in sales with a rise in prices.

A monopolist can take better decisions with the help of knowledge of demand elasticity. Electricity companies charge different rates from different types of consumers depending on the usage. Domestic customers are charged less than industrial customers.

Income elasticity helps manufacturers forecast and estimate demand for their products.

To the Government:

The government should consider the elasticity of demand while taxing commodities. Tax imposition on commodities with inelastic demand brings in substantial revenue. If the demand is elastic, a rise in prices leads to a reduction in demand and hence a firm's revenues are not high. This will result in less tax revenue to government.

To Trade Unions:

This concept is useful to trade unions in wage bargaining. If the demand for the company's products they are working for is elastic, the union leaders ask for a higher wage to the workers.

International trade:

The concept of demand elasticity is useful to formulate export and import policies of a country.

3.7 CHECK YOUR PROGRESS

1.If the price elasticity of demand for a good is 0.75, the demand for the good can be described as:

A)Normal B) Elastic C) Inferior D) Inelastic

2. When the price of a product is increased 10 percent, the quantity demanded decreases 15 percent. In this range of prices, demand for this product is:

A) Elastic B) Inelastic C) Cross-elastic D) Unitary elastic

3. The price elasticity of demand measures

A) The slope of a budget curve.

B) How often the price of a good changes.

C) The responsiveness of the quantity demanded to changes in price.

D) How sensitive the quantity demanded is to changes in demand

4. The price elasticity of demand equals

A) The percentage change in the quantity demanded divided by the percentage change in the price.

B) The change in the quantity demanded divided by the change in price.

C) The percentage change in the price divided by the percentage change in the quantity demanded.

D) The change in the price divided by the change in quantity demanded

Answers to check your progress: 1D, 2A, 3C and 4A

3.8 SUMMARY

Effective demand forecasting requires that a firm is able to measure the impact of changes in variables such as price, income, substitutes' prices, trends and fashion, habits, etc. on the quantity demanded. Demand for a product depends on price and a number of other factors. To understand the quantitative changes in price and demand, one has to study the elasticity of demand. Price elasticity of demand indicates the percentage change in demand as a consequence of change in prices. One can exactly measure the extent of price elasticity of demand with the help of different methods like ratio, revenue and point methods.

Income elasticity measures the quantum of changes in demand and changes in income of the customers. Cross elasticity is the extent of change in the price of one commodity and corresponding changes in the demand for another related commodity. Advertising elasticity measures the responsiveness of demand to changes in advertisements or promotions. The concept of elasticity of demand has great theoretical and practical application in all aspects

of business life.Knowing these elasticities help businessmen forecast demand accurately. It also helps the government to fix tax rates on commodities and to formulate import and export policies. The trade union leaders use it effectively in bargaining for better wages from the company.

3.9 KEY WORDS

Elasticity is the change in the quantity demanded in response to a change in price, income, substitutes' prices, trends and fashion, habits, etc.

Price elasticity is the rate of change in the quantity demanded to a change in price of the product

Income elasticity is the rate of change in the quantity demanded to a change in incomes of the consumer

Cross elasticity is the rate of change in the quantity demanded to a change in prices of substitutes or related products

Advertising elasticity is the rate of change in the quantity demanded to a change in promotional expenditure

3.10 QUESTIONS FOR SELF STUDY

1. A firm increases its promotional expenditure from 50000 to 75000. Its sales increased by 20% over the initial volume of 100000 units. Measure the promotional elasticity of demand.
2. What is elasticity of demand? What are the factors that influence elasticity?
3. Explain the cross elasticity of demand. What is the cross elasticity of substitute goods and complementary goods?
4. Distinguish between price, income, cross and advertisement elasticity of demand with appropriate examples.
5. What is point elasticity? How do you measure it?

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UNIT - 4 DEMAND ESTIMATION AND FORECASTING

STRUCTURE

4.0 OBJECTIVES

After studying this unit, you will be able to ;

- explain the importance and need for demand estimation and forecasting in decision making
- Identify the different forecasting techniques
- Elucidate appropriate models for demand forecasting

4.1 INTRODUCTION TO DEMAND ESTIMATION

Demand forecasting refers to the estimation of future demand for a product under given conditions. An important aspect of demand analysis is correct demand forecasting of products. Such forecasts are very useful to management in the short run and long run as information regarding future demand is very important for planning and scheduling production, purchasing raw materials, finance acquisition, etc. Such information is essential to avoid over and under production. Firms should estimate the future demand for their products. Demand forecasts play an important role in planning the acquisition of men and material, organizing production and sales channels.

Demand forecasts are done at micro and macro levels. A good demand forecasting method must be accurate, reasonable, economical, durable, flexible, simple, quick yielding and permit changes in the demand relationships on day to day basis. The important features of demand forecasting are:

1. A forecast is made for a specific period of time which would be sufficient to take a decision and put into action.
2. It is in terms of specific quantities
3. It is undertaken in an uncertain atmosphere.
4. It is based on historical information and the past data.
5. It tells us only the approximate demand for a product in the future.
6. It is based on certain assumptions and therefore not precise.

4.2 SHORT PERIOD DEMAND ESTIMATION

All business firms seek to estimate the demand for their products. Knowing the demand is a significant activity for the firm. The firm should understand the current demand for its products so that it can avoid over-production or under-production in the following term.

Over production leads to moneys locked up in business and under production drives customers to look for substitutes ultimately resulting in loss of customers. These unpleasant situations are best avoided by successful firms. Information about the current level of demand also helps firms determine their pricing policy and promotional policy which in turn leads to higher sales and revenues. Demand estimation is the process of finding current values of demand at different price levels. It is information about the current demand for a firm's product. If the demand, product and pricing data is collected for a short period, usually a year or less, it is known as short term demand estimation.

4.2.1 OBJECTIVES OF SHORT TERM DEMAND ESTIMATION

1. To reduce costs of raw materials, cut down raw material consumption and maintain sufficient stock of materials to meet market requirements
2. To set sales targets to salesmen and meet sales budget estimates
3. To arrange for promotional activities for the product, such as advertising, banners, etc.
4. To prepare pricing policies for the products
5. To prepare production schedules and avoid over production and under production
6. To arrange for short term financial requirements of the firm

4.2.2 USES OF SHORT TERM DEMAND FORECASTING

Demand forecasts for short periods are made on the assumption that the company functions on a certain production capacity and the period is too short to change the existing production capacity. It is generally presumed that a short run period is of one year duration.

1. **Production planning**: It helps in determining the level of output at various time intervals thus avoiding under or over production.
2. **Helps to formulate right purchase policy:** It helps in better material management—buying right quantity of raw materials and control inventory levels (raw material and finished goods) cutting down the cost of operation.
3. **Helps to frame realistic pricing policy:** It helps to formulate a rational pricing policy to meet the short run and seasonal variations in demand.
4. **Sales forecasting:** It helps the company to set realistic sales targets.
5. **Helps in estimating short run financial requirements:** It helps the company to plan the finances required for achieving the production and sales targets. The company will be able to raise the required finance well in advance at reasonable rates of interest.

6. **Reduce elements of chance:** The firm can plan its production properly and face the challenges of competition efficiently.

7 **Helps to evolve a suitable labour policy:** A proper sales and production policy helps to determine the exact number of labourers to be employed in the short run.

4.3 LONG PERIOD DEMAND FORECASTING

Some firms have a futuristic approach and therefore are interested in long term demand estimation. They are interested in long run production planning, new product development, expansion, investment in new products, etc. Such decisions have long term impact on the firm. Though the actual production may start after a considerable period of time, planning and streamlining of activities begin at present. For example, large cement plants or steel industries require three to five years to begin production. It is therefore necessary to forecast demand five years hence. Thus, demand forecasting may be defined as the process of finding values for demand in various future time periods.

4.3.1 OBJECTIVES OF LONG PERIOD DEMAND ESTIMATION

1. To ascertain future demand for the product and prepare for expansion activities
2. To understand new lines of profitable business before making huge investments
3. To prepare long term financial planning
4. To estimate man power requirements required to meet the sales forecasts

4.3.2 USES OF LONG TERM DEMAND FORECASTING

Long run forecasting of probable demand for a product is generally for a period of 3 to 5 or 10 years.

1. **Business Planning:** Forecasting helps in planning expansion of existing unitsand construction of new production units. Capital budgeting of a firm is based on long run demand forecasting.
2. **Financial Planning:**It helps to plan the long run financial requirements and investment programs. Decisions as to the quantity ofmoney to be raised from the open market, types of issues, timing of issues, etc. can be planned.
3. **Manpower Planning:**It helps in strategizing the long term human resource requirements and types of training to be provided.
4. **Business Control:**Control over costs helps a business to earn higher profits thus making it possible to regulate business effectively and to meet the challenges of the market.

5. **Determination of the Growth Rate of the Firm:** Accurate demand forecasting can help the management know the levels of the company's growth.
6. **Stability in the Working of the Firm:** Fluctuations in production cause ups and downs in business. Demand forecasting reduces production uncertainties and help in stabilizing the activities of the firm.
7. **Indicates Interdependence of Different Industries:** Demand forecasts of particular products become the basis for demand forecasts of other related industries, e.g., demand forecast for cement industry supply information to the most likely demand for machinery, raw material etc.

4.4 STEPS IN DEMAND ESTIMATION

The following are the major steps involved in demand estimation

- Specification of the demand function
- Data collection
- Specification of demand function

1. Demand function is the relationship that exists between the quantity demanded and all factors influencing the demand. The factors influencing demand are the price of the product, prices of substitutes, prices of complementary goods, advertisements and promotional activities, consumers' incomes, tastes and preferences, fashion, expectations about future prices, climatic and weather conditions, etc. The demand function can be expressed as:

$$Qx = b1Px + b2Y + b3Ps + b4Pc + b5Pa + b6Ptp + b7Pf + b8Pfe + b9Pcw + e$$

Qx is the quantity demanded of product X

b1, b2, b3,…are coefficients of the demand function

Px is the price of the product

Y is the income or GDP

Ps is the price of the substitute

Pc is the price of complementary good

Pa is the advertisement effect

Ptp is consumers' tastes and preferences

Pf is fashion

Pfe is expectations about future prices

Pcw is climatic and weather conditions

e is the error term representing random or unspecified factors

2. Data Collection

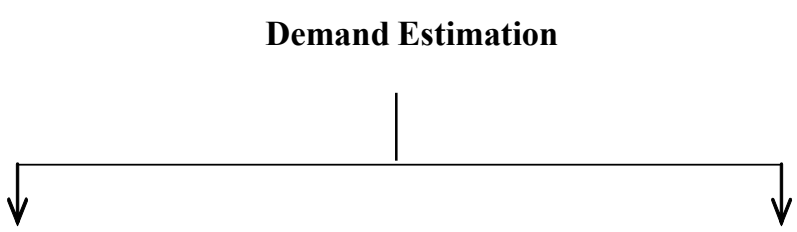
Required data is collected for the variables identified in the demand function. Tools like correlation and regression analysis is used to study the empirical relationship and the degree of association of the determinant variables of demand.

3. Result Reporting and Interpretation

The empirical values are reported in a detailed and systematic manner. The various parameters are reported as short term and long term elasticity.

4.5 DEMAND ESTIMATION METHODS

There are 2 methods of demand estimation—direct and indirect methods. In direct methods, inputs from customers and experts' opinion are collected by talking to them personally or through questionnaires. Their opinions and feedback about product pricing, prices, quality and uniqueness of substitutes and complementary goods, promotional campaign, etc. is collected.



Direct Methods

1. Consumer surveys
2. Experts' opinion
3. Delphi method
4. Simulating market situation
5. Controlled market experiments

Indirect Methods

1. Trend Projection
2. Correlation technique
3. Multiple regression analysis

4.5.1 DIRECT METHODS

1. Consumer Surveys

Questionnaires containing questions about buyers' intentions with regard to prices, quality, advertising, usefulness, uniqueness, packing, etc. are collected through personal interviews, by mail or through telephonic interviews. In the personal interview method, house to house survey is made to get information about the product. Though a very expensive method, it is considered to be the best method to elicit information. If it is not possible to meet respondents personally, mail surveys are taken up by companies. The advantage of this method is that a large number of people can be covered in a short time and is not very expensive. In the telephonic interview method, the respondents are contacted over phone and their opinionssought. This method is preferable when quick information is desired.

2. Experts' Opinion Survey

The sales line managers and executives are the people who are in constant touch with the consumers. The customers give their feedback about the company's products to these people about the product very often. A firm can ask its sales force to undertake surveys in their regions regarding the expected future demand for the product and about the current pricing and promotional campaigns. The data so collected may be tabulated and inferences drawn by the management. The company can also take the help the market consultants and professional experts who are into the business of forecasting. This method of collecting information from experts is also called as "Collective Opinion" method as the forecasts are based on the aggregate opinion of the experts in the field.

Between the two methods above, survey method is simple and less expensive than the direct consumer survey method. It requires less time and is a reliable method to judge the market. However, it suffers from some drawbacks. The opinions are subjective and not completely reliable. The views and estimations of the firm's representatives may be biased. The salesmen, to protect their jobs and to project a good image to the management may give highly optimistic figures and may over estimate demand.

3. Delphi Method:

Delphi method is experts' opinion method introduced by Olaf Helmer in the late 1940s. This method is used for conducting opinion poll or survey. It is simply an extension of the simple expert opinion poll method. This method is used to consolidate the divergent expert opinions and to arrive at a probable estimate of future demand. Under this method, a group of experts are repeatedly questioned for their opinion and their agreement or disagreement to the issue is clearly identified. It is a time-saving method which can be

effectively used on a heterogeneous group of experts with different backgrounds. The major drawback of this method is that it pre-supposes that the participants are objective in approach and possess great thinking ability and reasoning.

4. Simulated Market Situation

An artificial market situation is created and participants are selected. The participants are then given some money by the company asking them to spend in an artificially simulated departmental store. Different prices are set up or different promotional efforts are put up for the products. Members are asked to spend money on competing products and their responses regarding price changes and promotional efforts are observed and noted down. Later necessary decisions about price and promotional efforts are taken.

Simulated market situations have the limitations of being time-consuming, expensive and the results not being a true representation of the market. The participants should be rightly chosen in order to have the right picture of the market.

5. Controlled Market Experiments

A firm may reduce the price in one market and observe buyers' reactions. Alternatively, different prices may be fixed for different markets and the buyers' responses observed. Likewise, a promotional campaign may be launched in one or some markets and the reactions of customers recorded. If the responses are positive and satisfactory, the company can then launch the product on a bigger scale with sufficient promotional support. This method of price fixation is useful when the product is new and there are no close substitutes to the product and the firm is not sure about market reactions to the product. Price experimentation helps the firm to identify the right price. Controlled market experiments will help companies in identifying the coefficients or elasticities of independent variables in the demand function.

The disadvantages of this method is that it is a very expensive method. Changes in sales may not occur solely due to price changes. Several other factors like income, tastes, preferences, fashion, etc. contribute to sales of a product. These factors are not considered in this experiment. Secondly, if the experiment is conducted over a very short period, the results may not be reliable. The experiment must be conducted over a long period to establish a definite relationship between the controlled factor and the sales level.

4.5.2 INDIRECT METHODS

Indirect methods of demand forecasting for short period primarily consist of statistical tools like trend projections and regression analysis. Once the demand function is clearly specified, coefficient or elasticities of independent variable is found with the help of regression analysis. The following two methods are widely used to estimate demand

1. Trend Projections

In this method, past data about the dependent and independent variables are used. This method is also called the Time Series Analysis Method. Time series is a set of observations taken at specified time, generally at equal intervals. It depicts the historical pattern under normal conditions. This method is not based on any particular theory as to what causes the variables to change but merely assumes that whatever forces contributed to change in the recent past will continue to have the same effect. This technique is based on the assumption that the factors responsible for the past trends would continue to be the same in future as well and in the same magnitude and direction. On the basis of time series, it is possible to project the future sales of a company. Data is collected for a particular period, say for five years or ten years and the resulting trend is extrapolated into future periods. The results are used as the basis for demand estimation. Changes in time series data arise on account of the following reasons:

1. **Secular or Long-run Movements:** Secular movements indicate the general conditions and direction in which graph of a time series move in a relatively long period of time.
2. **Seasonal Movements:** Time series undergo changes during seasonal sales of a company. During festival season, sales clearance season etc., there are many unexpected changes.
3. **Cyclical Movements:** Change in time series or fluctuations in the demand for a product during different phases of a business cycle like depression, revival, boom etc. are called as cyclical movement changes.
4. **Random Movements:** When changes take place at random and there is no particular reason, it is called irregular or random movements. These movements imply sporadic changes in time series occurring due to unforeseen events such as floods, strikes, elections, earth quakes, droughts and other such natural calamities. Such changes take place only in the short run and have their own impact on the sales of a company.

An illustration of time series analysis will make things clear.

Illustration 1

The following are the rainfall recorded in Karnataka for 10 years. Calculate the line of best fit.

Year	Sales (in 000 units)
2001	10
2002	12
2003	11
2004	15
2005	18
2006	14
2007	20
2008	18
2009	21
2010	25

To find the line of best fit, the following equation is used.

$Y = a + bX$

Y represents the rainfall which is dependent variable

A is the intercept and b is the coefficient of X (an independent variable). In the above example, it represents the different time periods, 1,2,3,4 and so on.

To calculate the values of a and b, the following equation is used:

$Y = Na + b\Sigma X$

$XY = a\Sigma X + b\Sigma X^2$

Where N is the number of observations

Year	Sales in 000 units	Time Period	X^2	XY
2001	10	1	1	10
2002	12	2	4	24
2003	11	3	9	33
2004	15	4	16	60
2005	18	5	25	90
2006	14	6	36	84
2007	20	7	49	140
2008	18	8	64	144
2009	21	9	81	189
2010	25	10	100	250
N=10	$\Sigma Y=164$	$\Sigma X=55$	$\Sigma X^2=385$	$\Sigma XY=1024$

Solution:

Substituting the above values in the equation, we get

164 = 10a + 55b

1024 = 55a + 385b

Solving these two simultaneous equations, we get the value of a and b as 8.26 and 1.48 respectively. The equation for the line of best fit is Y =a + bX, can now be written as

Y = 8.26 + 1.48b.

With the help of this equation, we can compute the sales for 2015, 2018 and 2020.

Applying the equation,

For 2015 Y = 8.26 +1.48*15 = 30.46 thousand units

For 2018 Y = 8.26 +1.48*18 = 34.90 thousand units

For 2020 Y = 8.26 +1.48*20 = 37.86 thousand units

Illustration 2

A fast food restaurant conducted a study of the demand of burgers. It found that the average daily demand (D) in terms of price (P) is given by the equation:

D = 700-5P

Required: (a) How many burgers can the restaurant sell per day if the price one burger is 25/-?

(b) If the restaurant wants to sell 500 burgers per day, what is the price it should charge?

(c) What is the highest price one should be willing to pay?

Solution:

(a) D = 700-5P

Given P = 25, D = 700-5*25 = 575

(b) D = 700-5P

Given D = 500, the equation can be written as 500 = 700-5P which is equal to 500-700 = 5P. Solving this, we get P = 40.

(c) D = 700-5P

D = 1, therefore, 1 = 700-5P

P = (700 -1)/5 = 699/5 = 139.8

1. Regression Analysis

This is a widely used statistical technique to estimate the value of the unknown variable from the known values of variables. It is a very useful tool to find the change in quantities demanded when other independent variables like price, income, tastes, preferences, promotions, etc. change. Let us suppose that advertising expenditure (X) and sales (Y) of a product are closely related. With the help of a regression equation, we find the regression equation and estimate the probable value of Y, that is, sales for a given value of X (advertisement expenditure).

While determining the demand functions of a commodity, the analyst may come across some products whose demand function depends on a single independent variable. For example, if in a city there are only 2 modes of transportation—public transport system and autos available for people. On a particular day an auto association want to estimate the demand for auto rides on account of strike by public transport alternative. The variable auto ride is directly proportional to non-availability of public transport. One is a dependent variable and the other independent. Auto is independent and public transportation is dependent.

The above case is a single variable demand function. When two variables are considered and a relationship established between the dependent and the independent variable, it is called a simple regression. If on the other hand, a researcher wants to estimate the demand for sweets to be sold in a festive season, he would look into various variables like the product's own price, income, population, etc. When the relationship is between the dependent variable and a number of independent variables, it is known as Multiple Regression. Solving regression equations and calculating the values are very complex and requires time. However, with statistical software, simple and multiple regressions are estimated quickly.

Example (Single Variable Model)

The following data represents the population and the consumption of rice in a particular city. Forecast the demand for rice for the year.

Year	Population	Rice consumption (000 tons)
2000	10	40
2001	12	50
2002	15	60
2003	20	70
2004	25	80
2005	30	90
2006	40	100

Solution:

The regression equation is represented by the formula Y = a + bX, where Y is the quantity of rice consumption, X is the population and a and b are constants.

The trend line is $Y = Na + b\Sigma X$

$$XY = a\Sigma X + b\Sigma X^2$$

Calculation of the linear equation

Year	Population (millions) (X)	Rice consumption (000 tons) (Y)	X^2	XY
2000	10	40	100	400
2001	12	50	144	600
2002	15	60	225	900
2003	20	70	400	1400
2004	25	80	625	2000
2005	30	90	900	2700
2006	40	100	1600	4000
$\Sigma n = 7$	$\Sigma X = 152$	$\Sigma Y = 490$	$\Sigma X^2 = 3994$	$\Sigma XY = 12000$

Substituting and solving the equations, $Y = Na + b\Sigma X$

$$XY = a\Sigma X + b\Sigma X^2$$

We get Y = 27.44 + 1.96X

The demand for 2010 when the population is expected to be 150 millions can be calculated as under: Y = [27.44 + 1.96X] =[27.44 + 1.96*150] which is equal to 321.44*1000 tons = 321440 tons

4.6 DEMAND FORECASTING FOR NEW PRODUCTS

When a firm introduces a new product into the market, it faces a peculiar problem in estimating the demand for it. As the product is new, no past data is available and therefore it is difficult to project sales. Customers survey and experts opinions may be taken up to estimate the probable sales. The following approaches may be used to estimate the demand.

1. **Evolutionary Approach**: If the new product is an improvement over an existing product, it may replace the old product completely. In such cases, past sales of the existing product can be relied upon to project the sales of the new product. It is assumed that the new

product will also have the same demand and sales as the old product. Example—demandfor smartphones are projected based on the sales of ordinary cell phones.

2. **Substitute Approach**: If the new product is a substitute of an existing product, the share of the old product in the total market sales help to estimate the probable demand for the new product. Example—if a new variant of a car is to be introduced into the market, information about the market conditions and the sales of the older substitutes are collected and later the probable sales of the new car is estimated.

3. **Growth Curve Approach**: The growth rate and the sales of a new product can be estimated based on the growth of established products of similar nature. For example, demand for new household durables like furniture, television sets and refrigerators can be estimated by analysing the growth curves of similar existing furniture, television sets and refrigerators.

4. **Sales Experience Approach**: This approach is more suitable for new day to day used products. Buyers' responses to new products like soaps and detergents, tooth pastes and shampoos can be found from controlled market experience. New products can be introduced in some test markets and based on the information collected from the users of this market, the probable demand for new products are estimated. Most of the fast moving consumer goods fall under this category. A test market which is a representative of the average mind-set of people is selected and the product launched in this territory. Customer responses on the various factors like price, packaging, appearance, etc. are collected and later the product is launched nation-wide. For example, the detergent Ariel and Surf Excel were introduced in this fashion.

5. **Opinion Sampling Method**: A fair idea on market acceptance of a new product can be ascertained through consumer surveys. This can be done through the use of questionnaire, personal interviews or mail surveys which may be conducted by using the direct method of demand estimation, sampling.

6. **Vicarious Approach or Experts' Opinion**: Customers reactions to new products can be found indirectly through dealers, salesmen, consultants and market experts. These people know the market trends and customer opinions and feedback about old products which help new product manufacturers gain some knowledge about customer preferences.

In conclusion, companies try several of the above approaches to estimate demand for new products. No one approach is accurate. The substitute approach may suit some products while for some others, opinion sampling may have to relied upon. Of all the methods listed above, vicarious approach is the simplest, quickest and least complicated. However, salesmen

and dealers in their enthusiasm to present a rosy picture about a product may sometime over estimate and give wrong reports. Their reports should not blindly taken, instead should be counter checked before taking a final decision.

4.7 CHECK YOUR PROGRESS

1. One purpose of short-range forecasts is to determine

    a. Production planning

    b. Inventory budgets

    c. Research and development plans

    d. Job allocation

    e. All of the above

2. Forecasts used for new product planning, capital expenditures, facility location or expansion, and R&D typically utilize a

    a. Short-range time horizon

    b. Medium-range time horizon

    c. Long-range time horizon

    d. All of the above

3. Decisions relating to production scheduling involve**:**

    a) Short-term forecasting

    b) Both short-term as well as medium-term forecasting

    c) Medium-term forecasting

    d) Long-term forecasting

4. Demand forecasting is important for

    a) Price control

    b) Business planning

    c) Competitive strategy

    d) All of the above

Answers to check your progress: 1E, 2A, 3A and 4D

4.8 SUMMARY

An important aspect of demand analysis is the correct forecasting of demand for their products. Demand forecasting refers to the estimation of future demand under given conditions. Such forecasts are very useful to management in the short run like production planning, purchase policy, pricing policy, sales forecasting, estimating short run financial requirements, labor policy, stock control, etc. In the long run, they help in efficient business planning, financial planning, to regulate business efficiently, to determine the growth rate of firm and to stabilize the activities of the firm. Demand forecasts are done at micro and macro levels. A good demand forecasting method must be accurate, economical, durable, flexible, simple, quick yielding and permit changes in the demand relationships on day to day basis.Statistical methods like trend projection and economic indicators are generally used to make demand forecasts.

4.9 KEY WORDS

Demand Forecasting is the estimation of future demand under given conditions.

Consumer Survey Method of demand forecasting involves directly interviewing the potential customers

Experts' Opinion Method is a firm seeking the help of its sales force to undertake surveys about the expected future demand, current levels of pricing and promotional campaigns about the product.

Delphi Method of demand forecasting is a group of experts being repeatedly questioned for their opinion and their agreement or disagreement about an issue.

Simulated Market Situation is creating an artificial market like situation and the participants participating in the buying-selling process

Controlled Market Experiments: In this method, a firm reduces the price and observes buyers' reactions. Alternatively, it may fix different prices for different markets and observe the buyers' responses.

Trend Projection is the study of movements of variables through time using time-series data.

Regression Analysis estimates the demand for a product by the use of independent or explanatory variables.

4.10 QUESTIONS FOR SELF STUDY

1. What are the important methods of demand forecasting
2. Distinguish between short term demand estimation and long term demand forecasting
3. Write short notes on

a. Delphi method

b. Vicarious approach

c. Controlled market experiments

4. The annual sales of a company are as follows:

Year	Sales (In lakhs)
2007	45
2008	48
2009	54
2010	63
2011	79

Fit a straight line trend and estimate the sales of 2014.

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