BALAJI INSTITUTE OF I.T AND MANAGEMENT KADAPA

MANAGERIAL ECONOMICS (17E00103)

ICET CODE: BIMK

FIRST INTERNAL

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Name of the Faculty: S. GHOUSE

Units covered: 1st , 2nd & half of 3rd Units

(17E00103) MANAGERIAL ECONOMICS

Objective of this course is to understand the relevance of economics in business management. This will enable the students to study functional areas of management such as Marketing , Production and Costing from a broader perspective.

1. **Introduction to Managerial Economics:** Definition, Nature and Scope, Relationship with other areas in Economics, Production Management, Marketing, Finance and Personnel, Operations research - The role of managerial economist. Objectives of the firm: Managerial theories of firm, Behavioral theories of firm, optimization techniques, new management tools of optimization.
2. **Theory of Demand**: Demand Analysis – Law of Demand - Elasticity of demand, types and significance of Elasticity of Demand. Demand estimation – Marketing research approaches to demand estimation. Need for forecasting, forecasting techniques.
3. **Production Analysis**: Production function, Isoquants and Isocosts, Production function with one/two variables, Cobb-Douglas Production Function, Returns to Scale and Returns to Factors, Economies of scale- Cost concepts - cost-output relationship in the short run and long run, Average cost curves - Break Even Analysis.
4. **Market Structure and Pricing practices**: Features and Types of different competitive situations - Price-Output determination in Perfect competition, Monopoly, Monopolistic competition and Oligopoly. Pricing philosophy – Pricing methods in practice: Price discrimination, product line pricing. Pricing strategies: skimming pricing, penetration pricing, Loss Leader pricing. Pricing of multiple products.
5. **Inflation and Business Cycles:**-Definition and meaning-characteristics of Inflation- types of inflation - effects of inflation - Anti-Inflationary methods - Definition and characteristics of business cycles-phases of business cycle - steps to avoid business cycle

Textbooks:

- Managerial Economics •Analysis, Problems, Cases, Mehta, P.L., Sultan Chand &Sons.
- Managerial Economics, Gupta, TMH

References:

- Managerial Economics, D.N.Dwivedi,Eighth Edition,Vikas Publications
- Managerial Economics, Pearson Education, James L.Pappas and Engene F.Brigham
- Managerial Economics, Suma Damodaran, Oxford.
- Macro Economics by MN Jhingan-Oxford
- Managerial Economics- Dr.DM.Mithani-Himalaya Publishers
- Managerial Economics-Dr.H.L Ahuja-S.Chand and Com pvt ltd, New Delhi
- Managerial Economics by Dominick Salvatore, Ravikesh Srivastava- Oxford University press.
- Managerial Economics by Hirschey- Cengage Learning.

UNIT-I

INTRODUCTION TO MANAGERIAL ECONOMICS

Managerial economics is an integral part of business. Demand, supply, cost, production, market, competition, price, etc. are important concepts in real business decisions. A study of managerial economics enriches the **analytical skills**, helps in the logical structuring of problems, and provides adequate solution to the economic problems. Managerial economics draws on economic analysis for such concepts as cost, demand, profit and competition. The terms used **Business Economics** and **Managerial Economics** are often synonyms. It is also known as **'Economics for Managers**. Economics is an Applied Economics in the sphere of business management.

Managerial Economics = Management + Economics

Definition of Managerial Economics-

"Managerial Economics is the integration of economic theory with business practice for the purpose of facilitating decision-making and forward planning by management."

- Spencer & Siegelman

"Managerial Economics is economics applied in decision-making. It is a special branch of economics bridging the gap between the economic theory and managerial practice. Its stress is on the use of the tools of economic analysis in clarifying problems in organizing and evaluating information and in comparing alternative courses of action."

-W. W. Haynes

"Economics is concerned with the application of economic principles and methodologies to the decision making process within the firm or organization under the conditions of uncertainty" - Prof**. Evan J Douglas**

Economics

The branch of knowledge concerned with the production, consumption, and transfer of wealth.

Management

Management is the science and art of getting things done through people.

Manager

Manager is a person who directs resources to achieve a stated goal and he/she has the responsibility for his/her own actions as well as for the actions of individuals, Machines and other inputs under the manager's control. Get things done through People in organization, Resources such as

Men
Materials
Machine
Money and Technology.

Managerial Economics is the study of how scarce resources are directed most efficiently to achieve managerial goals. It is a valuable tool for analyzing business situations to take better decisions

<u>Management Functions</u>

- Planning
- Organizing
- Staffing
- Directing and the efforts of his staff
- Controlling

- Communicates to them the goals, objectives, policies and procedures.
- Coordinates their efforts.
- Motivates them to sustain their enthusiasm.
- Leads them to achieve the corporate goals.

The economic way of thinking about business decision making provides all managers with a powerful set of tools and insights for furthering the goals of their organization.

Successful managers take good decisions, and one of their most useful tools is the methodology of managerial economics.

Managerial Decision

It is clear that managerial decision making is influenced not only by economics but also by several other significant considerations. While economic analysis contributes a great deal to problem solving in an enterprise it is important to remember that three other variables also influences the choices and decision made by the managers

.

- **Human and behavioral considerations**
- **Technological forces**
- **Environmental factors.**

Decision making steps There are certain things which are to be taken into account while making decisions. No matter what's the size of the problem but like everything decision making should also be in certain steps. Following are the various steps in decision making:

- **Establish objectives**
- **Specify the decision problem**
- **Identify the alternatives**
- **Evaluate alternatives**
- **Select the best alternatives**

- **Implement the decision**
- **Monitor the performance**

Economic Tools in Managerial Economics

Managerial economics is a branch of economics which deals with the application of economic concepts, theories, tools, and methodologies to solve practical problems in a business. Managerial economics analyzes the economic implications of short- and long-term planning decisions.

Nature of Managerial Economics

Art and Science: Managerial economics requires a lot of logical thinking and creative skills for decision making or problem-solving. It is also considered to be a stream of science by some economist claiming that it involves the application of different economic principles, techniques and methods, to solve business problems.

Micro Economics: In managerial economics, managers generally deal with the problems related to a particular organisation instead of the whole economy. Therefore it is considered to be a part of microeconomics.

Macro Economics: A business functions in an external environment, i.e. it serves the market, which is a part of the economy as a whole.

Therefore, it is essential for managers to analyse the different factors of macroeconomics such as market conditions, economic reforms, government policies, etc. and their impact on the organisation.

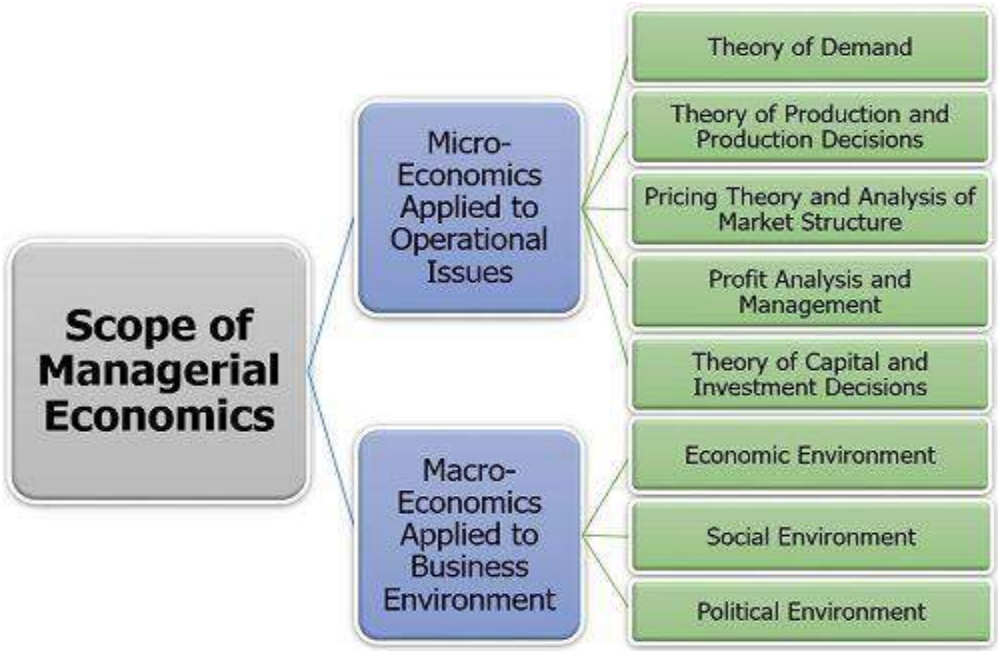
Multi-disciplinary: It uses many tools and principles belonging to various disciplines such as accounting, finance, statistics, mathematics, production, operation research, human resource, marketing, etc.

Prescriptive / Normative Discipline: It aims at goal achievement and deals with practical situations or problems by implementing corrective measures.

Management Oriented: It acts as a tool in the hands of managers to deal with business-related problems and uncertainties appropriately. It also provides for goal establishment, policy formulation and effective decision making.

Pragmatic: It is a practical and logical approach towards the day to day business problems.

Scope of Managerial Economics:



Micro-Economics Applied to Operational Issues

To resolve the organisation's internal issues arising in business operations, the various theories or principles of microeconomics applied are as follows:

Theory of Demand: The demand theory emphasises on the consumer's behaviour towards a product or service. It takes into consideration the needs, wants, preferences and requirement of the consumers to enhance the production process.

Theory of Production and Production Decisions: This theory is majorly concerned with the volume of production, process, capital and labour required, cost involved, etc. It aims at maximising the output to meet the customer's demand.

Pricing Theory and Analysis of Market Structure: It focuses on the price determination of a product keeping in mind the competitors, market conditions, cost of production, maximising sales volume, etc.

Profit Analysis and Management: The organisations work for a profit. Therefore they always aim at profit maximisation. It depends upon the market demand, cost of input, competition level, etc.

Theory of Capital and Investment Decisions: Capital is the most critical factor of business. This theory prevails the proper allocation of the organisation's capital and making investments in profitable projects or venture to improve organisational efficiency.

Macro-Economics Applied to Business Environment

Any organisation is much affected by the environment it operates in. The business environment can be classified as follows:

Economic Environment: The economic conditions of a country, GDP, economic policies, etc. indirectly impacts the business and its operations.

Social Environment: The society in which the organisation functions also affects it like employment conditions, trade unions, consumer cooperatives, etc.

Political Environment: The political structure of a country, whether authoritarian or democratic; political stability; and attitude towards the private sector, influence organizational growth and development.

Study of managerial economics-

Major Essentials involves the analysis such as-

- **Demand analysis and methods of forecasting**
- **Cost analysis**
- **Pricing theory and policies**
- **Profit analysis with special reference to break-even point**
- **Capital budgeting for investment decisions**
- **The business firm and objectives**
- **Competition.**

Managerial Economics Comes From Economic Theory

Micro Economics- Theory of firm &the behavior &problems of individuals

Macro Economies- Behavior of the economy as a whole & the theories about its operation.

Microeconomics	**Macroeconomics**
Demand and supply Between individuals	Total economic environment
⇕	⇕
Consumer's Buyers Vendor's Providers	Studies related to local national, regional and global economies

Fig-1.1- Micro Economics & Macro Economies

Micro Economics:

- ✓ Study of on individual consumer or a firm is called "micro economics" also called as "Theory of firm".
- ✓ Deals with behavior and problems of single individual and of Micro Organization. Micro means "one millionth".
- ✓ It is concerned with the application of the concepts such as price theory, law of demand and theories of market structure.

Macro Economics:

- ✓ Study of "aggregate" or total level of Economic activity called Micro economics.
- ✓ Studies the flow of economic resources or factors of production (such as Land, Labor, Capital, Organization and technology) from the resources owner to the business firms and then from the business firms to the households.
- ✓ It studies the interrelations among various aggregates and Examines their nature and behavior, their determination and causes of fluctuations in them.
- ✓ It deals with the price level in general, instead of studying the prices of individual commodities. It is concerned with the level of employment in the economy.
- ✓ It discusses aggregate consumption, aggregate investment, price level and National income. Important tool of Micro economics include national income analysis, balance of payments, theories of employment and so on…

Managerial Decision Areas

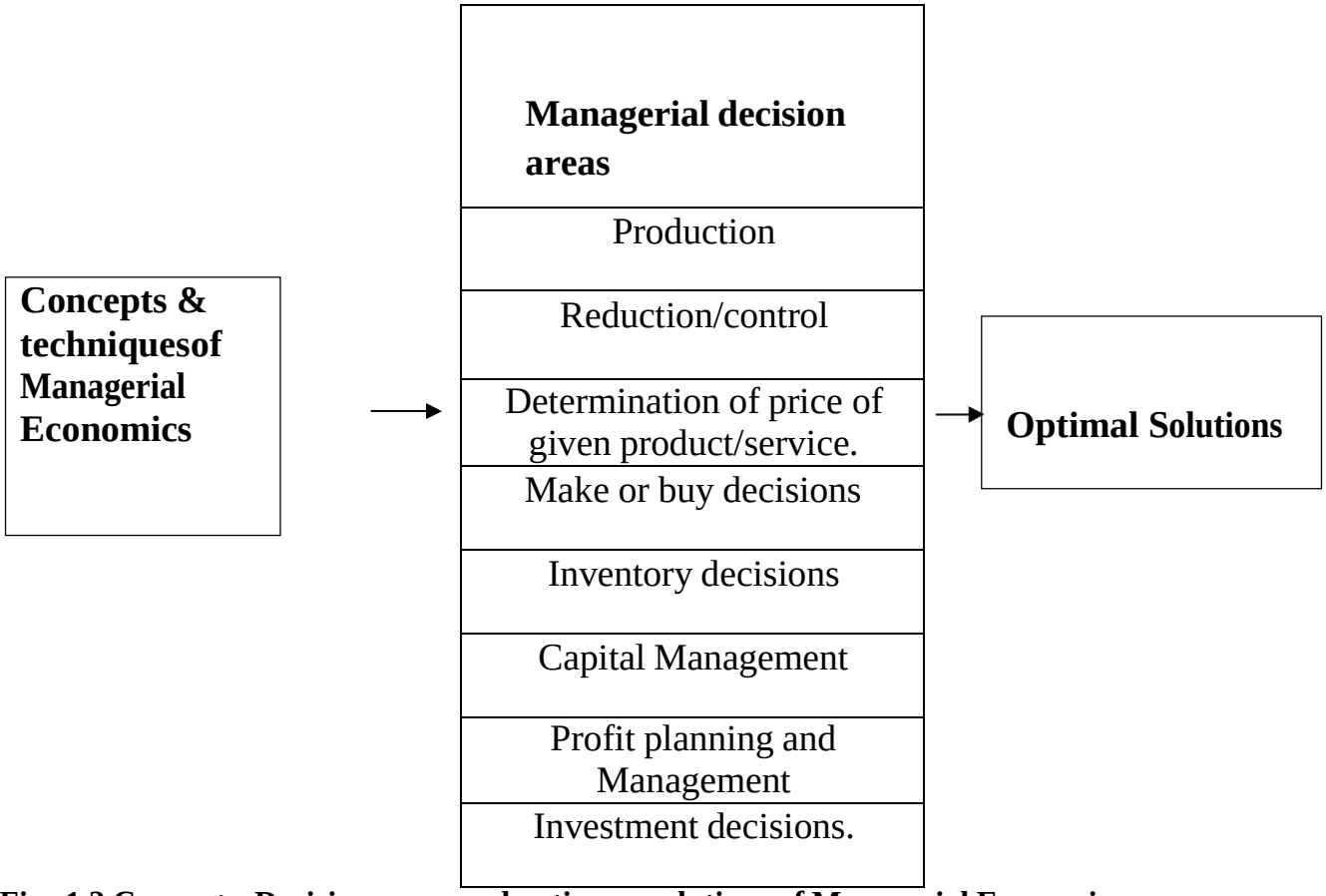


Fig:-1.2 Concepts, Decision areas and optimum solutions of Managerial Economics

RELATIONSHIP WITH OTHER AREAS IN ECONOMICS:

It has gained by interaction among by economics, mathematics statistics& has drowned upon management theory& accounting concepts. Managerial Economics is a part of normative economics as its focus is more on prescribing choice & action. Managerial Economics draws on positive economics by utilizing the relevant theories as a basis for prescribing choices, System of logic. Managerial Economics uses come from economic theory.

After studying the above you will be able to distinguish managerial economics with its related subjects. Managerial economic is not something which is related to economics only, but there are other areas also to which managerial economic is related.

Other related subjects of managerial economics are:

1. Production Management: Economic techniques are used to analyze production efficiency, optimum factor allocation, costs and economies of scale and to estimate the firm's cost function. A firm needs to answer four basic questions.

What to produce quality and quantity in the given line of production-
How to produce quality and quantity in the given line of production-
How much to produce for increasing productivity-
Whom to produce the quality and quantity in the given line of production

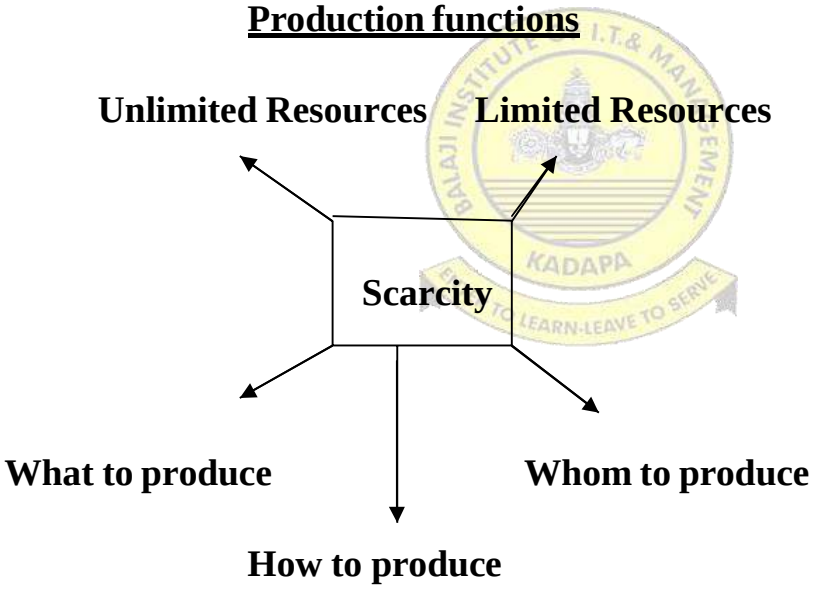


Fig:-1.3- Production functions about scarcity

It deals with production functions and productivity as well as input and output relationship.

Economic efficiency under the-

- **large-scale operations**
- **Technical substitution (inputs)**

- **Laws of returns**
- **Cost-benefit analysis in inventory management**
- **pricing policies and strategy**

2. Marketing Management: Manufacturing and marketing are integral part of business activity. Manufacturing efficiency depends on production management. Successful marketing are based on the analysis of:

Consumer behavior

And

Market demand

Managers use this to get better of all external risks to maximize profits for the firms. A long lost of alternate paths of marketing, sales and the best trade-off is chosen. Marketing strategies penetrate market deeply.

Pricing the product

Most profitable Most acceptable

Customers

Risk analysis is to study risk associated with marketing and finally supply.

Pricing analysis is

To determine optimum price and

To produce capital budget highlights and best investments to make.

3. Finance Management: Finance is the blood of modern commerce. It relates to resource allocation decisions on stockholder/issuance decisions, capital budgeting issues, and employee salary decisions. In these financial data we apply statistical and mathematical

models to create optimal decision for decision makers. Major dimensions of financial management such as ---

- **Capital budgeting**
- **Investment allocations**
- **Depreciation**
- **Method of raising money in economical ways**

Financial managers decisions about cash flows arrangement and flows in financial trade-offs in short and long terms are enrooted in economics. Difference financial ratios such as

↘ **Profit-earnings ratio & Rate of returns.**

4. Personal Management: Personal Management is the baseline for industrial organization. Quality is important for enhancing productivity, wage rates, salaries, perks etc., remuneration and determination for the human resource of the is economic bearing. In this way economics and personal management are interlinked.
Issues imply integration of economics with personnel management of economics are-

- **Labor training**
- **Trade unionism**
- **Industry-labor relations**
- **Workers participation**

Man power planning is an economic idea. And also personnel management deals with issues related to both Managerial –**supervisory and non supervisory**.

5. Operational Research management: Operational management is an integral part of decision science concerned with mode building towards optimization. Economics can imply optimization. It deals with the ideas such as

↘ **cost-minimization & profit-maximization**

of a firm. Team developed models & tools, which has since grown as

- **operational research**,
- **Linear programming & inventory models.**

Economist focuses on maximizing profit minimizing the cost while operational research focus on concept of optimization.

The role of managerial economist

A **managerial economist** helps the management by using his analytical skills and highly developed techniques in solving complex issues of successful decision-making and future advanced planning.... He assists the business planning process of a firm. He also carries cost-benefit analysis.

Studies Business Environment

The managerial economist is responsible for analyzing the environment in which business operates. Proper study of all external factors that affect the functioning of organization is must for proper functioning. He studies various factors like growth of national income, competition level, price trends, phase of the business cycle and economy and updates the management regarding it from time to time.

Analyses Operations Of Business

He analyses the internal operation of business and helps management in making better decisions in regard to internal workings. Managerial economist through his analytical and forecasting skills provides advice to managers for formulating policies regarding internal operations of the business.

Demand Forecasting And Estimation

Proper estimation and forecasting of future trends helps the business in achieving desired profitability and growth. Managerial economist through proper study of all internal and external forces makes successful forecasting of future uncertainties or trends.

Production Planning

Managerial economist is responsible for scheduling all production activities of business. He evaluates the capital budgets of organizations and accordingly helps in deciding timing and locating of various actions.

Economic Intelligence

He provides economic intelligence services by communicating all economic information to management. Managerial economist keeps management always updated of all prevailing economic trends so that they can confidently talk in seminars and conferences.

Performing Investment Analysis

A managerial economist analyzes various investment avenues and chooses the most appropriate one. He studies and discovers new possible fields of business for earning better returns.

Focuses On Earning Reasonable Profit

He assists management in earning a reasonable rate of profit on capital employed in the business. Managerial economist monitors activities of organizations to check whether all operations are running efficiently as per the plans and policies.

Maintaining Better Relations

A managerial economist maintains better relations with all internal and external individuals connected with the business. It is his duty to develop a peaceful and cooperative environment within the organization and aims to reduce any opposition taking place.

Objectives of the firm

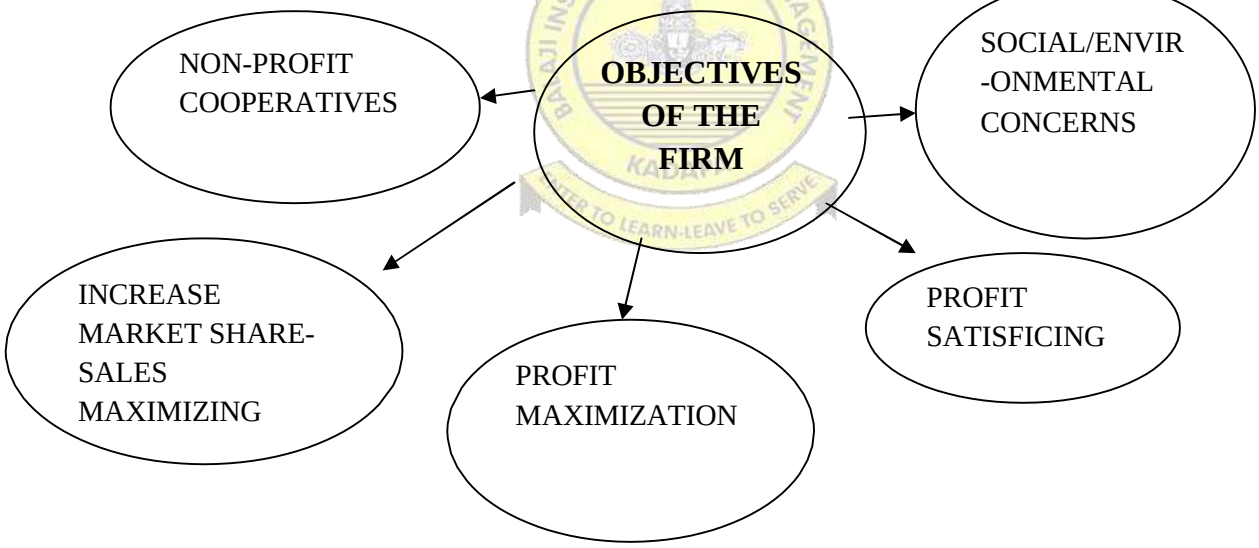


Fig: 1.4- Objectives of the firm

The major objectives of the firm are:

- To achieve the Organizational Goal
- To maximize the Output
- To maximize the Sales
- To maximize the Profit of the Organization
- To maximize the Customer and Stakeholders Satisfaction
- To maximize Shareholder's Return on Investment
- To maximize the Growth of the Organization

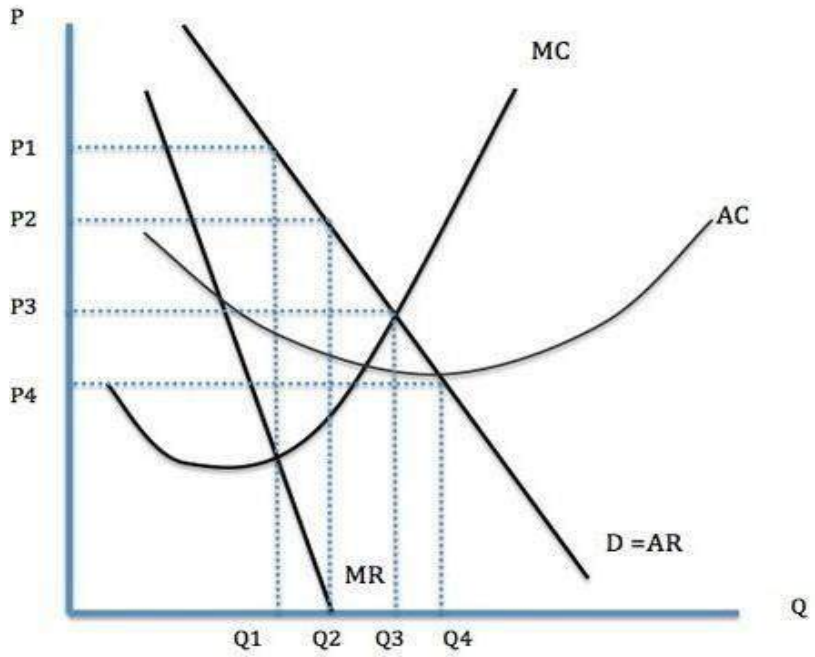


Fig: 1.5- objectives of the firm

The **first-order condition** requires that at the point where maximum profit is obtained, the marginal revenue (MR) must equal the marginal Cost (MC). Besides; the second-order condition requires that the first-order condition must be satisfied under the condition of decreasing marginal revenue (MR) and increasing marginal cost (MC). This implies that at the optimum point of profit maximization, marginal cost (MC) must intersect the marginal revenue (MR) from below.

The second condition requires that the second derivative of the profit function is expected to be less than zero. It can be concluded that maximum profit occurs where the first- and second-order conditions are satisfied.

1. **Profit maximization**
2. **Sales maximization**
3. **Increased market share/market dominance**
4. **Social/environmental concerns**
5. **Profit satisficing**
6. **Co-operatives/**

Seeking to increase market share, may lead to lower profits in the short-term, but enable profit maximization in the long run.

1. Profit maximization

- Higher dividends for shareholders.
- More profit can be used to finance research and development.
- Higher profit makes the firm less vulnerable to takeover.
- Higher profit enables higher salaries for workers
- In many firms, there is a **separation of ownership and control**. Those who own the company (shareholders) often do not get involved in the day to day running of the company.
- This is a problem because although the owners may want to maximize profits, the managers have much less incentive to maximize profits because they do not get the same rewards, (share dividends)
- Therefore managers may create a minimum level of profit to keep the shareholders happy, but then maximize other objectives, such as enjoying work, getting on with other workers. (e.g. not sacking them) This is the problem of separation between owners and managers.

- This ‘principal-agent‘ problem can be overcome, to some extent, by giving managers share options and performance related pay although in some industries it is difficult to measure performance.
- More on profit-satisfying

1. **Objective of maximization of Sales revenue**
2. **Objective of maximization of the growth rate**
3. **Objective of maximization of manager’s utility function**
4. **Objective of making satisfactory rate of profit**

2. Sales maximization

Firms often seek to increase their market share – even if it means **less profit.** This could occur for various reasons:

- Increased market share increases monopoly power and may enable the firm to put up prices and make more profit in the long run.
- Managers prefer to work for bigger companies as it leads to greater prestige and higher salaries.
- Increasing market share may force rivals out of business. E.g. the growth of supermarkets has lead to the demise of many local shops. Some firms may actually engage in predatory pricing which involves making a loss to force a rival out of business.

3. Growth maximization

This is similar to sales maximization and may involve mergers and takeovers. With this objective, the firm may be willing to make lower levels of profit in order to increase in size and gain more market share. More market share increases their monopoly power and ability to be a price setter.

4. Long run Profit Maximization

In some cases, firms may sacrifice profits in the short term to increase profits in the long run. For example, by investing heavily in new capacity, firms may make a loss in the short run but enable higher profits in the future.

5. Social/Environmental Concerns

A firm may incur extra expense to choose products which don't harm the environment or products not tested on animals. Alternatively, firms may be concerned about local community / charitable concerns. Some firms may adopt social/environmental concerns as part of its branding. This can ultimately help profitability as the brand becomes more attractive to consumers. Some firms may adopt social/environmental concerns on principal alone – even if it does little to improve sales/brand image.

6. Co-operatives

Co-operatives may have completely different objectives to a typical PLC. A co-operative is run to maximize the welfare of all stakeholders – especially workers. Any profit the co-operative makes will be shared amongst all members.

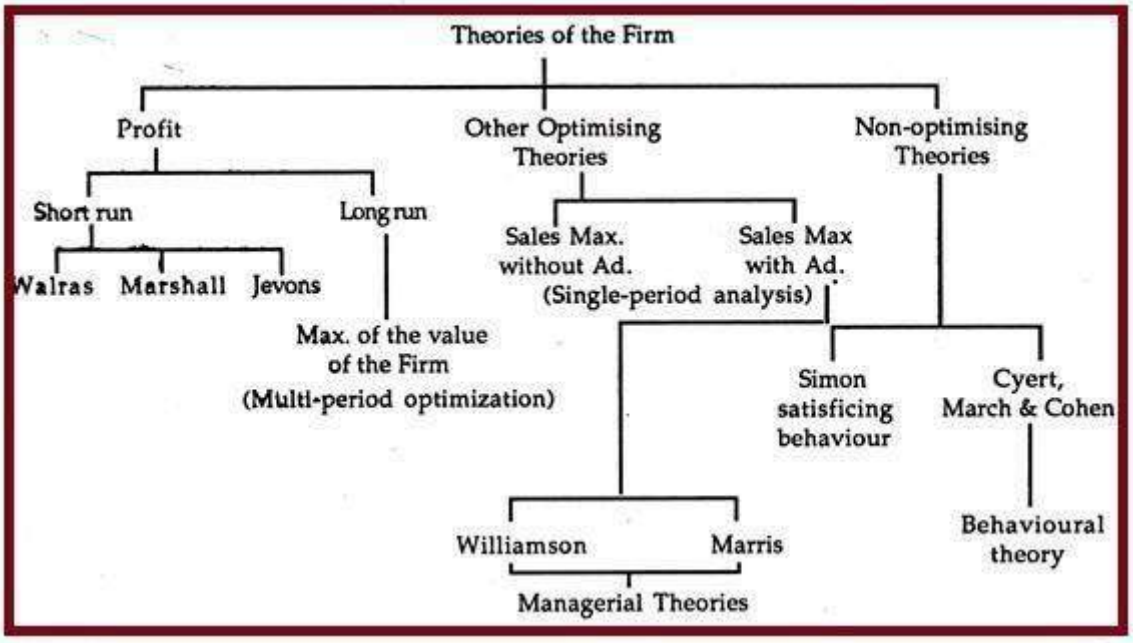


Fig: 1.6- THEORIES OF THE FIRM

THEORIES OF THE FIRM

The theory of firm is the center-piece and central theme of Managerial economics. A firm is an organization that combines and organizes resources for the purpose of producing goods and/or services for sale. The **model of business is called the theory of the firm**. In its simplest version, the firm is thought to have profit maximization as its primary goal. Today, the emphasis on profits has been broadened to include uncertainty and the time value of money. In this more complete model, the primary goal of the firm is long-term expected value maximization.

The concept of the **"firm" or the "company"** is commonly misunderstood. Too often, the corporate entities are confused with the people who own or operate the organizations. In fact, a firm is an activity that combines scarce productive resources to produce goods and services that are demanded by society. Firms are more appropriately viewed as an activity that transforms productive inputs into outputs of goods and services. There are various types of labor employed,

such as

Designers,

Machine tool operators,

Carpenters,

And

Sales personnel.

If the chair is made of wood, decisions must be made regarding the type or types of wood that will be used.`

Constraints and the Theory of the Firm

Managerial decisions are often made in light of constraints imposed by technology, resource scarcity, contractual obligations, laws, and regulations. Organizations frequently face limited availability of essential inputs, such as skilled labor, raw materials, energy, specialized machinery, and warehouse space.

Limitations of the Theory of the Firm

The theory of the firm which postulates that the goal of the firm is to maximize wealth or the value of the firm has been criticized as being much **too narrow and unrealistic**. Hence, broader theories of the firm have been purposed. The most prominent among these are:

Sales maximization (Adequate rate of profit)

⇩

Management utility maximization (Principle-agent problem)

⇩

Satisfying behavior

Expected Value Maximization

Today, the emphasis on profits has been broadened to encompass uncertainty and the time value of money. In this more complete model, the primary goal of the firm is long-term **expected value maximization**.

The **value of the firm** is the present value of the firm's expected future net cash flows. If cash flows are equated to profits for simplicity, the value of the firm today, or its **present value**, is the value of expected profits or cash flows, discounted back to the present at an appropriate interest rate.

$$\text{Value of the Firm} = \text{Present Value of Expected Future Profits}$$

$$= \frac{\pi_1}{(1+i)^1} + \frac{\pi_2}{(1+i)^2} + \cdots + \frac{\pi_n}{(1+i)^n}$$

$$= \sum_{t=1}^{n} \frac{\pi_t}{(1+i)^t}$$

Here, $\pi 1$, $\pi 2$, . . . πn represent expected profits in each year, *t,* and *i* is the appropriate interest, or discount, rate. The final form for Equation is simply a shorthand expression in which sigma (Σ) stands for "sum up" or "add together."

The term

$$\sum_{t=1}^{n}$$

Managerial theories of the firm

1. **Baumol's Theory of Sales Revenue Maximization**
2. **Marri's model of managerial enterprise**
3. **Williamsons model of managerial discretion**

1. Baumol's Theory of Sales Revenue Maximization

It should be noted that by sales maximization Baumol does not indicate the maximization of the physical volume of sales but the maximization of the total revenue of sales, i.e., rupee value of the sales The rationale in the rear this objective is the dichotomy between management and ownership in large business corporations. This existing situation of dichotomy provides managers a chance to set their purpose other than profit maximization goal which most owner-businessmen pursue. Prof. Baumol thinks that the managers are more interested in maximizing sales rather than profits. So far as empirical validity of sales revenue maximization objective is concerned, factual evidences are debatable. Despite of criticism Baumol's sales maximization model is a major alternative to profit maximization. Baumol's sales revenue maximization model highlights that the primary objective of a firm is to maximize its sales rather than profit maximization.

'The sales maximization goal says that managers of firms seek to maximize their sales revenue subject to the constraint of earning satisfactory profits."

When the profits of firms reach a level considered satisfactory by the shareholders then the efforts of the managers are directed to maximize revenue by promoting sales instead of maximizing profit. An acceptable level of profit is obtained their goal shifts to sales maximization in place of profit maximization.

Hence the objective is not to maximize profit, but to maximize sales revenue, along with which, firms need to maintain a minimum level of profit to keep shareholder satisfied. This minimum level of profit is regarded as the profit constraint.

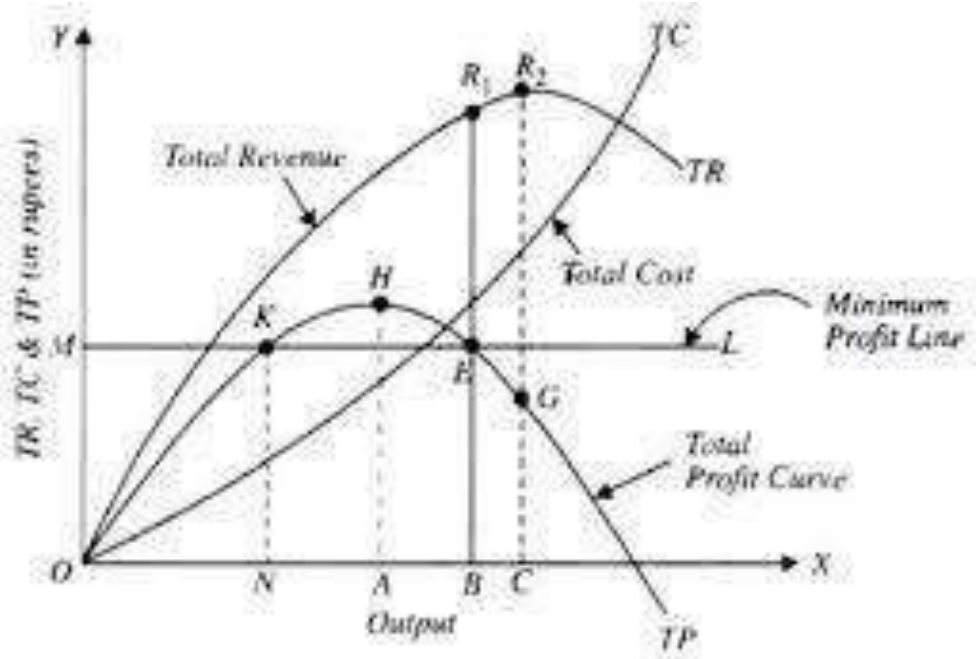


Fig: 1.7. Baumol's Theory of Sales Revenue Maximization

Maximizing sales rather than profits owing to the following basic reasons:

(1) The increasing sales add prestige to the managers whereas under the objective of maximization of profits, the profits go into the shareholders' pockets.

(2) There are sufficient grounds to understand that the performance and salaries of the top managers are highly correlated to sales.

(3) The financial and banking institutions consider sales of the firms to gauge their performance and inclined to finance the firms with rising sales.

(4) Under the situation of sales growing the personnel problems can be more suitably resolved. The employees at all the levels can be provided with higher emoluments when higher sales take place as higher sales would indicate better performance.

Baumol's Sales Maximization Model without Advertising

Baumol by sales maximization refers to maximization of total revenue. This does not mean the sale of large quantities of output, but refers to the increase in money sales (in rupee, dollar, etc.). Sales can increase up to the point of profit maximization where the marginal cost equals marginal revenue. If sales are increased beyond this point, money sales

may increase at the expense of profits. But the oligopolistic firm wants its money sales to grow even though it earns minimum profits.

But as we know that sales maximization is subject to minimum profit constraint. Arguments of Baumol are not sufficient to draw any definite conclusion.

i. More Realistic: Goal of maximization of sales is a more realistic goal- In fact, firms accord more importance to the goal of sales maximization than profit maximization. It is so because success of a firm is generally judged from its total sales.

ii. More Practical: Revenue maximization thesis of Baumol is more practical. It is so because goal of revenue (Sales) maximization leads to more production which, in turn, leads to fall in price. As a result, consumers' welfare is promoted.

iii. More Availability of Loans: At the time of sanctioning loan to a firm, financial institutions mainly consider its sales..

iv. Strong Position in the Market: Maximum sales of a firm symbolize its strong position in the market. Sales of a firm will be large only in that situation when consumers like its production, firm has more competitive power and has been expanding. All these features are indicative of the progress of the firm.

v. More Advantageous to the Managers: It is more to the advantage of the managers that the firm should aim at sates maximization. This way their credibility enhances in the market. Maximum sales is a reflection of the competence of the managers It has a favorable effect on their wages. Firm is in a position to offer higher wages to the employees.

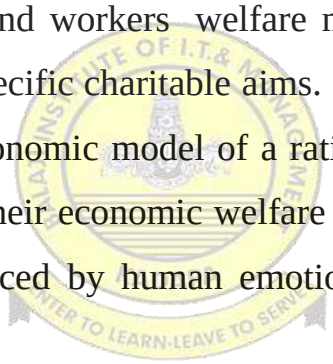
Employer-employee relations become more cordial in these types-

I. **Size of the firm** Some managers may simply aim for working in a big and seemingly successful firm which gives more prestige and honor. Managers may be motivated to prove their projects are successful. This can cause firms to pursue goals which have a high profile. It may explain why firms persist with projects which may not be desirable. There is a cost to letting go of past decisions.

II. **Profit satisfying**. Based on the problem of asymmetric information. Owners wish to maximize profits, but, workers don't. Because owners don't have perfect information, workers and managers are able to get away with decisions that don't maximize profits.

III. **Co-operative/ethical concerns**. Some firms may be set up with very different objectives to the traditional model of profit maximization. In co-operative firms, the goal is to maximize the welfare of all stakeholders. In this model, ideas of altruism, concern for the environment and workers welfare may explain many decisions. The firm may also be set up with specific charitable aims.

IV. **Human emotion/bias**. The economic model of a rational economic man assumes that individuals seek to maximize their economic welfare with rational choice. However, in the real world, we are influenced by human emotion. This could be discrimination based on bias and prejudice.



2. Marri's model of managerial enterprise

Prof. Penrose and Marri's consider this to be one of the primary goals of the managers. It is a common factor to observe that each firm aims at maximizing its growth rate as this goal would answer many of the objectives of a firm. **A growth rate is a better yardstick to measure the success of a firm**. Growth depends on the volume of investment. Investment depends on capital availability. Capital may come from either internal or external source. External source of capital is costly where as internal generation of funds is economical. Generation of internal capital depends on profit making capacity of a firm. **Profit maximization would automatically lead to growth maximization**. Marri"s points

out that a firm has to maximize its balanced growth rate over a period of time. Marri's, managers maximize firm's balanced growth rate subject to

Managerial and Financial constraints.

Managerial constraint-The capacity of a firm to carry out its functions effectively depends upon the size and skills of its managers. This capacity can be increased by recruiting managers. However proper co-ordination, cooperation and good team work are essential for effective decision making and planning skills on which the efficiency of the management depends. A New recruit requires time to learn and adjust to the company's environment before he is able to perform fully as a team member. Similarly, research and development sets a limit to the rate of growth of the firm.

Financial constraints- A manager always suffers from the fear of being dismissed if he is not up to the mark in taking decisions as far as the financial policies of the firm are concerned. Marri's suggests that job security is attained by adopting prudent financial policy. The financial fear may arise, if the firm's policies are such that it may cause the firm bankruptcy. In that case, shareholders may decide to replace the old with the new management in the hope to run the firm more successfully. Managers also face the risk if their policies make the firm attractive for takeover and mergers. This will also result in **replacement of the old by the new management**. Managers, who are generally **risk averters**, will think of avoiding these risks by not undertaking even highly profitable but risky investments. Managers choose a prudent financial policy consisting of three financial ratios (Debt Equity Ratio, Liquidity ratio & Retention Ratio).

The three financial ratios set a limit to the growth of the firm.

1. The management has to maintain a low liquidity ratio, ie, liquid asset / total assets. A high liquidity ratio may affect the profits of the firm but a low ratio should not create any financial embarrassment to meet the required payments to all the concerned parties.

2. The management has to maintain a high debt / asset so ratio so that it will have enough money to invest in orders to stimulate growth.
3. The management has to keep a high level of retained profits for further expansion and development but it should not displease the share holder by giving low dividends.

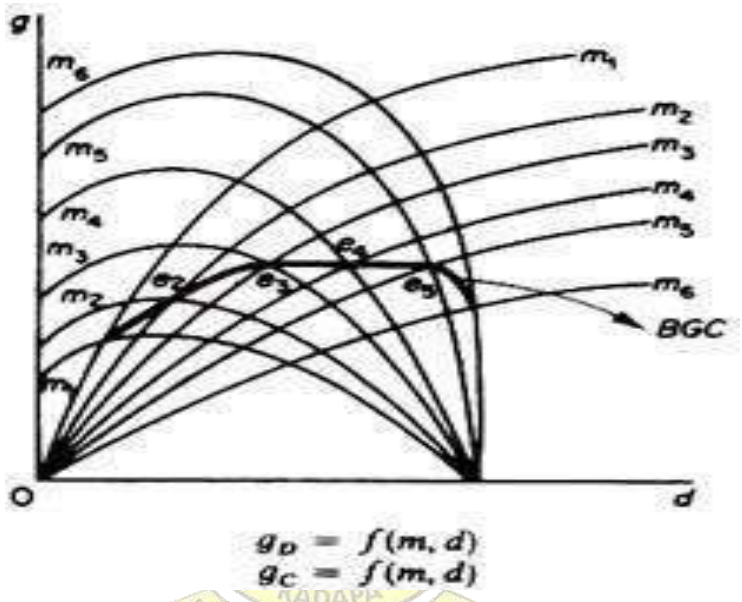


Fig: 1.8. Marri's model of managerial enterprise

Marri's defines firm's balanced growth rate (G) as

G = GD = GC

Where GD = growth rate of demand for firms product and

GC = growth rate of capital supply to the firm.

The Marri's model states that in order to maximize balanced growth rate or reach equilibrium position, there should be equality between the growth rate in demand for the products and growth rate in supply of capital.
The two growth rates are according to Marri's, translated into two utility functions:

(i) Manager's utility function, and

(ii) Owner's utility function.

The manager's utility function (Um) and owner's utility function (Uo) may be specified as-

Um = f (salaries, power, status, prestige, job security, etc)

Uo = f (size of output, capital, market share, volume of profit, public esteemed).

Owner's utility function (U_o) implies growth of demand for firms product and supply of capital.

Therefore, maximization of Uo means maximization of 'demand for firm's product' or growth of capital supply'.

Marri's is more rigorous and sophisticated than Baumol's sales revenue maximization, has its own weaknesses.

1. It fails to deal with oligopolistic interdependence.
2. It ignores price determination which is the main concern of profit maximization hypothesis.
3. It is doubtful whether both managers and owners would maximize their utility functions simultaneously always.
4. The assumption of constant price and production costs are not correct.
5. It is difficult to achieve both growth maximization and profit maximization together.

3. Williamson's theory of managerial discretion

The managerial theory of firm developed by Oliver E. Williamson states that managers apply discretion in making and implementing policies to maximize their own utility rather than trying for the maximization of profit which ultimately maximize own utility subject to minimum profit. Profit works as a limit to the top managers' behavior in the sense that the financial market and the shareholders require a minimum profit to be paid out in the form of dividends, otherwise the job security of managers is put in danger. Hence, managers look at their self-interest while making decision on price and selling quantity

of output. Manager's decision on price and output differs from the decisions of profit maximizing firm.

Utility maximization of managers guided by their own self-interest is possible, like in Baumol's sales maximization model, only in a corporate type of business organization with the separation of ownership and management functions. Such organizational structure permits the managers of a firm to pursue their own self-interest, subject only to their ability to keep effective control over the firm. In particular managers are fairly certain of keeping hold of their power

(i) If profits at any time are at an acceptable level,

(ii) If the firm shows a reasonable rate of growth over time, and

(iii) If sufficient dividends are paid to keep the stockholders happy.

Williamson's model suggests that manager's self-interest focuses on the achievement of goals in four particular areas, namely:

1. High salaries

2. Staff under their control

3. Discretionary investment expenditures

4. Fringe benefits (i.e., additional employee benefit: an additional benefit provided to an employee, for example, a company car or health insurance)

The managerial utility function includes such variables as salaries, security, power, status, prestige and professional excellence. The others are non pecuniary. Therefore, in order to make them operational, they must be expressed in terms of other variables with which they are related and which are measurable. Staff expenditures, emoluments and discretionary investment expenses are measurable in money terms and will be used as proxy-variables to replace the non-operational concepts (e.g. power, status, prestige, professional excellence) appearing in the managerial utility function.

$$U = f(S, M, ID)$$

S = staff expenditure, including managerial salaries;

M = managerial emoluments; and

ID = discretionary investment; f(S, M, ID) is the utility function.

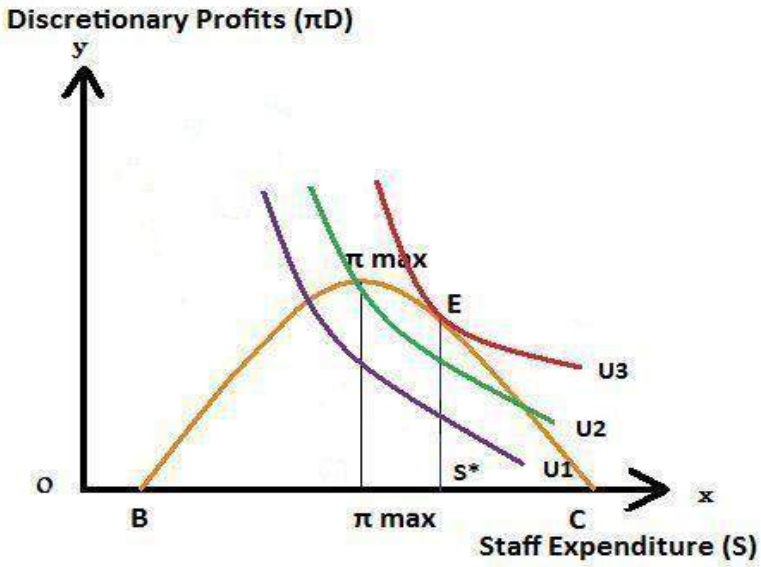


Fig: 1.9.Williamsons theory of managerial discretion

Behavioral theories of Managerial Economics

1. **Simon's satisfying model**
2. **Cyert and March**

1. Simon's satisfying model:

Herbert A. Simon propounded the bounded rationality model to explain why limits exist to rational decision within decision – making environment. Decision – making as "the alternative courses of action". He states that, decision – making pervades the entire organization that is decisions are made at all level of organizations. Hence, he said an organization as structure of decision – makers. Only limited, often unreliable information is available regarding possible alternatives and their consequences. Human mind has only limited capacity to evaluate and process the information that is available. Only a limited amount of time is available to make a decision. Therefore, in reality the individuals who

propose rational choices are bound to make satisfying rather than maximizing or optimizing choices in complex situation. It influences the human or organizational decision by bounded rationality leading to **'satisfying decisions'** as against maximizing decisions (optimizing decisions).

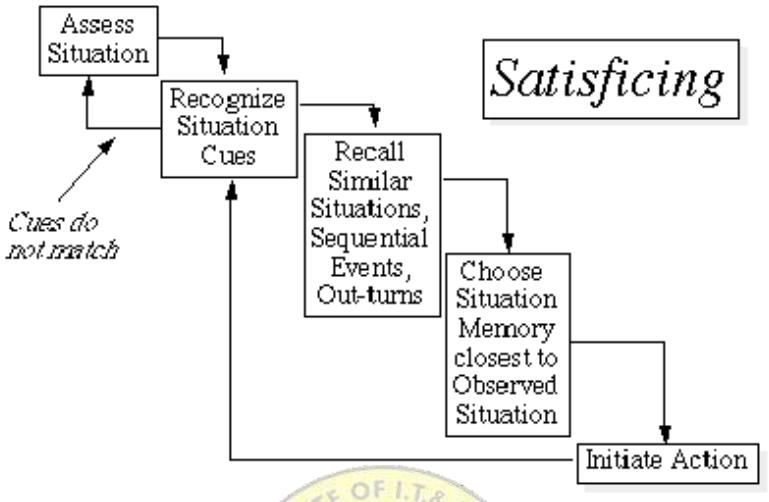


Fig: 1.10. Simon's satisfying model

The main weakness of the satisfying theory of Simon is that he has not specified the 'target' level of profits which a firm aspires to reach. Unless that is known, it is not possible to point out the precise areas of conflict between the objectives of profit maximizing and satisfying. Baumol and Quant do not agree with Simon's notion of "satisfying". According to them, it is constrained maximization "with only constraints and no maximization."Simon does not clarify a satisfactory level of performance based on "a certain level or rate of profit". This is in no way better than the profit maximization model. The profit maximization model suggests an optimum level of profits. But in the Simon model, there may be many "satisfactory levels" depending upon the groups that operate in the firm. It is very difficult for the firm to choose such a profit rate that satisfies all groups functioning within the firm. Thus the operational value of Simon's model is limited. Despite these weaknesses, Simon's theory was the first theory on which the latter behavioural theories have been developed.

But the firm does not feel satisfied in the first situation. It may be that the firm has set its aspiration level very high. It will, therefore, revise it downwards and start a search

activity to fulfill its various goals in order to achieve the aspiration level in the future. Similarly, if the firm finds that the aspiration level can be achieved, it will be revised upwards. It is through such search activity that the firm will be able to reach the aspiration level set by the decision-maker.

2. Cyert and March: Cyert and March have put forth a systematic behavioural theory of the firm. In a modem large multiproduct firm, ownership is separate from management. The firm is not considered as a single entity with a single goal of profit maximization by a single decision-maker, called the entrepreneur. Cyert and March regard the modem business firm as a group of individuals who are engaged in the decision-making process relating to its internal structure having multiple goals.

- They deal not only with the internal organization of the firm but also with the problem of uncertainty.
- They reject the assumption of certainty in the neo-classical theory of the firm.
- They emphasize that the modem business firm is so complex that individuals within it have limited information and imperfect foresight with respect to both internal and external developments.

Cyert and March regard the modem business firm as a complex organization in which the decision-making process should be analyzed in variables that affect organizational goals, expectations, and choices.

They look at the firm as an organizational coalition of managers, workers, shareholders, suppliers, customers, and so on.

1. Production Goal:

The production goal represents in large part the demand of those coalition members who are connected with production. It reflects pressures towards such things as stable

employment, ease of scheduling, development of acceptable cost performance and growth. This goal is related to output decisions.

2. Inventory Goal:

The inventory goal represents the demands of coalition members who are connected with inventory. It is affected by pressures on the inventory from salesmen and customers. This goal is related to decisions in output and sales areas.

3. Sales Goal:

The sales goal aims at meeting the demand of coalition members connected with sales, who regard sales necessary for the stability of the organization.

4. Market-Share Goal:

The market-share goal is an alternative to the sales goal. It is related to the demands of sales management of the coalition who are primarily interested in the comparative success of the organization and its growth. Like the sales goal, the market-share goal is related to sales decisions.

5. Profit Goal: The profit goal is in terms of an aspiration level with respect to the money amount of profit. It may also be in the form of profit share or return on investment. Thus the profit goal is related to pricing and resource allocation decisions.

Cyert and March limit the number of goals to five because, according to them, to expand the list rapidly meets the point of diminishing returns. According to them, all goals must be satisfied because they are relevant to price, output and sales strategy decisions of the organization.

"Although all goals must be satisfied in any organization, there is an implicit order of priority which is reflected in the way search activity takes place"

If one of the goals is not met and the individual responsible for that is not satisfied, a search will be made for a means to meet that goal. The search will be quite narrow and the organization will use rules-of-thumb to set the problem right. The rules-of -thumb are based on the past experience of the firm and the people within it.

Optimization Techniques

Optimization techniques are very crucial activities in managerial decision-making process. According to the objective of the firm, the manager tries to make the most effective decision out of all the alternatives available. Though the optimal decisions differ from company to company, the objective of optimization technique is to obtain a condition under which the marginal revenue is equal to the marginal cost.

The first step in presenting optimization techniques is to examine the methods to express economic relationship. Now let's have a look at the methods of expressing economic relationship −

- Equations, graphs, and tables are extensively used for expressing economic relationships.
- Graphs and tables are used for simple relationships and equations are used for complex relationships.
- Expressing relationships through equations is very useful in economics as it allows the usage of powerful differential technique, in order to determine the optimal solution of the problem.

Relationship between total, marginal, average concepts, and measures is really crucial in managerial economics. Total cost comprises of total fixed cost plus total variable cost or average cost multiply by total number of units produced

TC = TFC + TVC or TC = AC.Q

Marginal cost is the change in total cost resulting from one unit change in output. Average cost shows per unit cost of production, or total cost divided by number of units produced.

Optimization Analysis

Optimization analysis is a process through which a firm estimates or determines the output level and maximizes its total profits. There are basically two approaches followed for optimization −

A. Total revenue and total cost approach

B. Marginal revenue and Marginal cost approach

A. Total Revenue and Total Cost Approach

According to this approach, total profit is maximum at the level of output where the difference between the TR and TC is maximum.

$$\Pi = TR - TC$$

B. Marginal Revenue and Marginal Cost Approach

As we have seen in TR and TC approach, profit is maximum when the difference between them is maximum. However, in case of marginal analysis, profit is maximum at a level of output when MR is equal to MC. Marginal cost is the change in total cost resulting from one unit change in output, whereas marginal revenue is the change in total revenue resulting from one unit change in sale.

According to marginal analysis, as long as marginal benefit of an activity is greater than marginal cost, it pays for an organization to increase the activity. The total net benefit is maximum when the MR equals the MC.

New management tools of optimization

1. **Benchmarking**
2. **Total quality management**
3. **Business Process Reengineering**:
4. **Learning Organization**

1. Bench-marking:

Because any process, product, or function in a business is eligible for benchmarking. Benchmarking is the process of comparing your own organization, its operations or processes against other organizations in your industry or in the broader marketplace. Benchmarking can be applied against any product, process, function or approach in business. Common focal points for benchmarking initiatives include measures of time, quality, cost and effectiveness, and customer satisfaction. The intent of benchmarking is to compare your own operations to that of competitors and to generate ideas for improving processes, approaches, and technologies to reduce costs, increase profits and strengthen customer loyalty and satisfaction..

Typically, the **benchmarking process involves**:

- Defining the subject of the benchmarking study
- Selecting and defining the measures
- Selecting the comparison set
- Collecting data on both the benchmarking subject and comparison set
- Assessing the data and identifying differences and gaps
- Analyzing the root causes of the differences or gaps
- Defining an improvement initiative, complete with goals
- Communicating the goals
- Implementing the improvement initiative and measuring results
- Reporting on the results, identifying improvements and repeating the process.

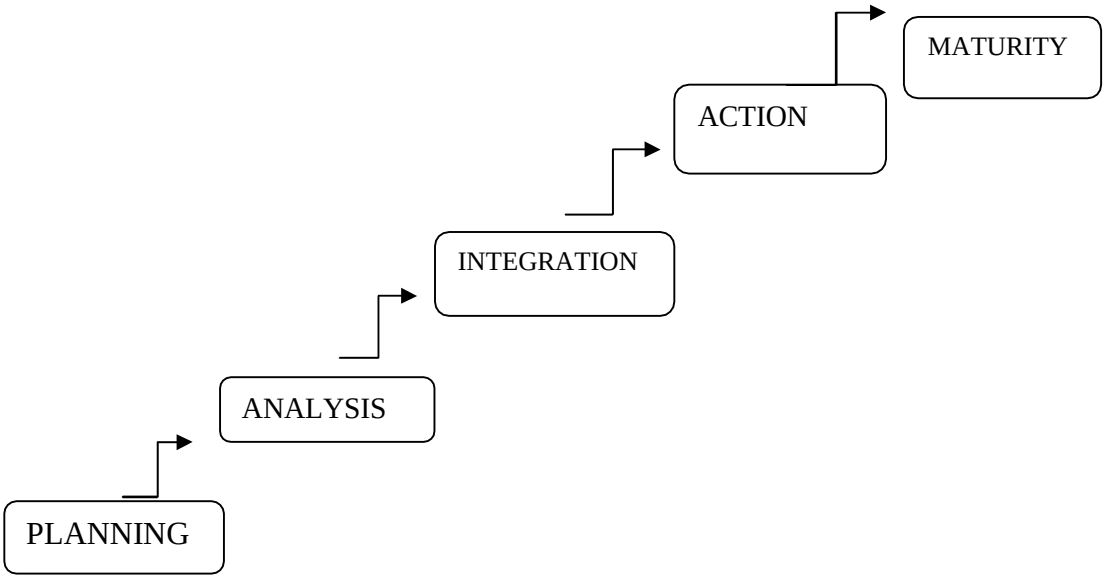


Fig: 1.11. Process of Benchmarking

2. Total Quality Management

TQM as "A management approach of an organization centered on quality, based on participation of all its members and aiming at long term benefits to all members of the organization and society."

TQM is "a system of continuous improvement employing participative management and centered on the needs of customer.

1. **Inspection:** measure the characteristics of a product and compare them with its specifications; the goal here is the fitness of standards. This is the passive "Inspecting" attitude.
2. **Quality Control**: inspection performed by the workers themselves with a feedback loop to the production line; here we avoid the "inspector" effect and allow some learning to take place.
3. **Quality Assurance:** set of (implemented) predefined and systematic activities necessary to give confidence in the process quality; one step further. Quality procedures are designed and planned as a whole to ensure that no bad products be delivered. We do not just rely on everybody's work and control.

This introduces the notion of a coherent set of quality procedures/tests. The given confidence (in the definition of QA) is important both for the producer and for the customer.

4. **Total Quality Management**: centered on quality and based on the participation of everybody which aims at the customer satisfaction and at the improvement of the company's personnel, of the company and of the society.

The ultimate step in TQM is a quality assurance plan is operational but the management; the workers and the customers continuously interact to review/improve this plan. Quality is concerned with meeting the wants and needs of customers. One of the key and enduring definitions is that "Quality is fitness for purpose". According to the British Standards, quality is defined as "the totality of features and characteristics of a product of service that bear on its ability to satisfy the stated or implied needs".

3. **Business Process Reengineering**:

BPR is known by many names, such as 'core process redesign', 'new industrial engineering' or 'working smarter'. All of them imply the same concept which focuses on integrating both business process redesign and deploying IT to support the reengineering work. In this section we attempt to explore two questions: where does BPR come from and what is involved in BPR.

Internal vs. External beliefs-

- **We value all our customers, both external and internal ·**
- **We must intolerant of mediocrity ·**
- **Teamwork is essential to our success ·**
- **We act with integrity in all we do ·**
- **We are determined to win and**
- **Celebrate our victory**

4. Learning Organization:

Organizational Learning and Learning Organization Organizational learning and learning organization are two different concepts. Organizational learning refers to particular activities processes within a organizations while the learning organization is a special type of organization. The systematic definition, a Learning organization is an organization that learns powerfully and collectively and constantly alter his that can better data collecting, management and use with aim of the organizational set success.

"Learning organization is an organization that helps to promote of organizational learning through structures and strategies creates. With regard to this means learning organizational is a dimension or elements of a learning organization."

-**Marquardt 1995**

Characteristics of a learning organization:

Characteristics of a learning organization introduced with Fundamental characteristics the following:

1) In Learning organization "information" runs smoothly at all levels of theOrganization

2) Learning is done simultaneously at four levels of individual, group, Intergroup, and organizational

3) Staff due to continuous training and delegating that be given to them, with Creating of numerous teams and doing group discussions to pay their Information and ability improves.

4) Learning organization has bright and consensus visions about the future, Growth and development of the organization and the employees.

5) Learning Organization is types of reflective thinking and insights about people, Organization and management.

Previous year questions

1. Briefly define the role and nature of managerial economics?
2. Briefly discuss the relationship of economics with other disciplines of Management?
3. Discuss the decision making process at the level of the firm?
4. What is optimization? What are the techniques of optimization?
5. Define firm? What are the objectives of the firm?
6. Briefly explain about managerial theories and behavioural theories of the firm

UNIT-2

THEORY OF DEMAND

The manufacturers produce and supply goods to meet demand. When the **Demand and supply** is equal the economic conditions of the country is in equilibrium position. This demand and supply are market forces which gives dynamism to the economic conditions of the country. The demand is not always static. The change in demand or elasticity of demand gives room for the managerial decision making like

- **What to produce,**
- **How much to produce,**
- **When to produce, and**
- **Where to distribute the products.**

2.1 Demand Analysis

Demand- Demand means the ability and willingness to buy a specific quantity of a commodity at the prevailing price in a given period of time. Therefore, demand for a commodity implies the desire to acquire it, willingness and the ability to pay for it.

Demand function It is a function that describe how much of a Commodity will be purchased at the prevailing prices of that commodity and related commodities, alternative income levels, and alternative values of other variables affecting demand. Price is not the only factor which determines the level of demand for a good. Other important factor is income. The rise in income will lead to an increase in demand for a normal commodity. A few goods are named as Inferior goods for which the demand will fall, when income rises.

Another important factor which influences the demand for a good is the price of other goods. Other factors which affect the demand for a good apart from the above mentioned factors are:

- **Changes in Population**
- **Changes in Fashion**
- **Changes in Taste**
- **Changes in Advertising**

A change in demand occurs when one or more of the determinants of Demand change and it is expressed in the following equation.

Qd X = f (Px, Pr, Y, T, Ey, Ep, Adv….)

Qd X = quantity demanded of good 'X'

Px = the price of good X

Pr = the price of a related good

Y = income level of the consumer

T = taste and preference of the consumers

Ey = expected income

Ep = expected price

Adv = advertisement cost

The above mentioned demand function expresses the relationship between the demand and other factors. The quantity demanded of commodity X varies according to the price of commodity (Px), income (Y), the price of a related commodity (Pr), taste and preference of the consumers (T), expected income (Ey) and advertisement cost(Adv) spent by the organization.

Demand Meaning

Demand refers to how much (quantity) of a product or service is desired by buyers. The quantity demanded is the amount of a product people are willing to buy at a certain price. Demand for a good by a consumer is not the same thing as his desire to buy it. A desire becomes a demand only when it is 'effective' which means that, given the price of the good, the consumer should be both willing and able to pay for the quantity which he wants to buy.

Thus three things are essential for a desire for a commodity to become effective demand.

- **desire for a commodity**
- **willingness to pay**
- **ability to pay for the commodity**

There are two basic models of individual demand. One, known as the theory of consumer behavior, relates to the direct demand for personal consumption products. This model is appropriate for analyzing individual demand for goods and services that directly satisfy consumer desires. This is also labeled as consumer demand.

Derived Demand

The outputs of engineers, production workers, managers, lawyers, consultants, office business Machines and natural resources are all examples of goods and services demanded not for direct consumption but rather for their use in providing other goods and services. Their demand is derived from the demand for the products they are used to provide. Input demand is called derived demand. This is also sometimes called business demand. The inputs purchased by a Business can be classified into raw materials, energy, labor, and capital, which may be substitutes or complements.

2.2 Law of Demand

The quantity of a commodity demanded in a given time period increases as its price falls, ceteris paribus. The Law of demand explains the functional relationship between

Price of a commodity and the quantity demanded of the commodity

It is observed that the price and the demand are inversely related which means that the two move in the opposite direction. An increase in the price leads to a fall in quantity demanded and vice versa. This relationship can be stated as

> **"Other thing being equal, the demand for a commodity varies inversely as the price**".

1. The concept of demand generally refers to the quantity demanded at a given time, which may be a point of time, a day or a week.

2. The law of demand is based on the assumption that within the given time frame, there would be no change in the quantity of the good in question. To put it differently, among the various determinants of demand, the price of the commodity is the only variable.

3. The term ―Ceteris parables associated with the law of demand, implies that taste and preferences, income, the prices of related goods, and social status, all remain constant over the period in which the impact of price variation on the quantity demanded is being analyzed.

4. The law of demand is a partial analysis of the relationship between demand and price, in the sense that it relates to the demand for only one commodity, say X, at a time or over a period of time.

Demand schedule

The quantities of a good that a consumer is willing and able to buy at the prevailing price in a given time period. This can be achieved by assuming, for, the moment, that the individual's income, the price of related commodities, and tastes are unchanged. The inverse relationship between the price and the quantity demanded of the commodity per timeperiod is then the individual's demand schedule for the commodity, and the plot of data (with price on the vertical axis and the quantity on the horizontal axis) gives the corresponding individual's demand curve per time period at lower prices.

The Demand Schedule for a product x

Price(in rupees)	Quantity demanded
50	1
45	3
40	5
35	7
30	9
25	12
20	15
15	17
10	20

Fig: 2.1. Demand Schedule

Demand Curve Determination

Demand curve shows price and quantity relation holding everything else constant.

Change in quantity demanded or movements along the same demand curve

- **Quantity demanded falls if price rises.**
- **Quantity demanded rises if price falls**.

Role of Non-Price Variables

Change in non-price variables will define a new demand curve that is demand curve shifts upwards or downwards.

- **Demand increases if a non-price change allows more to be sold at every price.**
- **Demand decreases if a non-price change causes less to be sold at every price.**

Distinct concepts of demand

1. Direct and derived demand: Direct demand refers to the **demand for goods meant for final consumption**. It is the **demand for consumer goods** such as sugar, milk, tea, food items etc. On the contrary to it, derived demand refers to the **demand for those goods which are needed for further production** of a particular good. For instance, the demand for cotton for producing cotton textiles is a case of derived demand. Indeed, **derived demand is the demand for producer's goods;** i.e., the demand for raw materials, intermediate goods and machine tools and equipment. Another example of derived demand is the **demand for factors of production**. The derived demand for inputs also depends upon the degree of substitutability/complementarities between inputs used in production process.

2. Domestic and industrial demand: The distinction between domestic and industrial demand is very important from the pricing and distribution point of view of a product. For instance, the price of water, electricity, coal etc. is deliberately kept low for domestic use as compared to their price for industrial use.

3. <u>Perishable and durable goods demand</u>: Perishable goods are also known as **Non-durable / single use goods**, While durable goods are also known as **non- perishable/ repeated use goods**.

Bread, butter, ice-cream etc are the fine example of perishable goods, while mobiles and bikes are the good examples of durable goods.

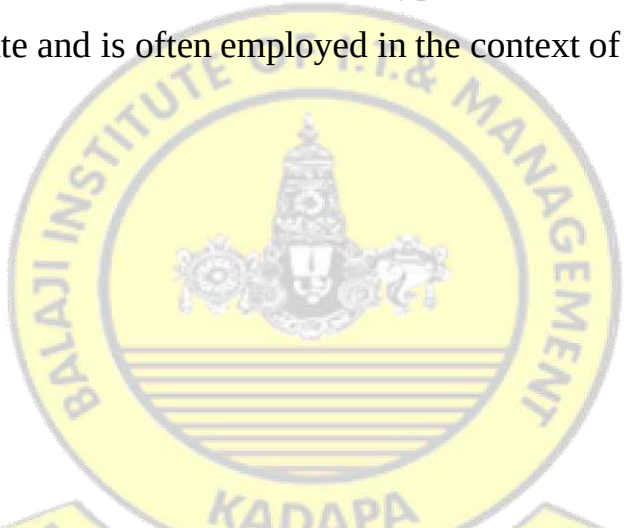
Both 'consumers' and 'producers' goods may be of perishable and non-perishable nature.

Perishable goods are used for meeting immediate demand, while durable goods are meant for current as well as future demand. Durable goods demand is influenced by the replacement of old products and expansion of stock. Such demand fluctuates with business conditions, speculation and price expectations. **Real wealth effect** has strong influence on demand for consumers durables.

4. <u>New and replacement demand</u>: New demand is meant for **an addition to stock**, while replacement demand is meant for **maintaining the old stock of capital**/asset intact.

The demand for spare parts of a machine is a good example of replacement demand, but the demand for new models of a particular item [say computer or machine] is a fine example of new demand. Generally, **new demand is of an autonomous type**, while the **replacement demand is induced** one-induced by the quantity and quality of existing stock. However, such distinction is more of a degree than of kind.

5. <u>Final and intermediate demand</u>: The demand for semi-finished goods and raw materials is derived and induced demand as it is dependent on the demand for final goods. The demand for final goods is a direct demand. This type of distinction is based on types of goods- final or intermediate and is often employed in the context of **input-output models**.



6. <u>Short run and long run demand</u>: The distinction between these two types of demand is made with specific reference to time element. Short- run demand **is immediate demand** based on available taste and technology, products improvement and promotional measures and such other factors.

Price-income fluctuations are more relevant in case of short- run demand, while changes in **consumption pattern**, **urbanization and work culture** etc. do have significant influence on long–run demand. Generally, long-run demand is for future consumption.

7. <u>Autonomous and induced demand</u>: The **demand for complementary goods** such as bread and butter, pen and ink, tea, sugar milk illustrate the case of induced demand. In case of induced demand, the demand for a product is dependent on the demand/purchase of some main product.

For instance, the demand for sugar is induced by the demand for tea. Autonomous demand for a product is **totally independent of the use of other product**, which is rarely found in the present world of dependence. These days we all consume bundles of commodities. Even then, all direct demands may be loosely called autonomous. The following equation illustrates the determinants of demand.

$$DX = á + â\,PX$$

8. Individual and Market Demand: The demand of an individual for a product over a period of time is called as an individual demand, whereas the sum total of demand for a product by all individuals in a market is known as market/collective demand The distinction between individual and market demand is very useful for personalized service/target group planning as a part of sales strategy formulation.

9. Total market and segmented market demand: A market for a product may have **different segments based on location, age, sex, income, nationality etc**. The demand for a product in a **particular market segment** is called as segmented market demand. Total market demand is a **sum total of demand in all segments of a market** of that particular product. Segmented market demand takes care of different patterns of buying behavior and consumer preferences in different segments of the market. Each market segment may differ with respect to delivery prices, net profit margins, element of competition, seasonal pattern and cyclical sensitivity. When these differences are glaring, demand analysis is done segment-wise, and accordingly, different marketing strategies are followed for different segments. For instance, airlines charge different fares from different passengers based on their class-economy class and executive/business class.

10. Company and industry demand: A company is a **single firm** engaged in the production of a particular product, while an industry is the **aggregate / group of firms** engaged in the production of the same product. Thus, the company's demand is similar to an individual demand, whereas the industry's demand is similar to the total demand. For instance, the demand for iron and steel produced by Bokaro plant is an example of company's demand, but the demand for iron and steel produced by all iron and steel companies including the Bokaro plant is the example of industry demand.

The determinants of a company's demand may be different from industry's demand.

There may be the inter-company differences with regard to technology, product quality, financial position, market share & leadership and competitiveness. The understanding and knowledge of the relation between company and industry demand is of great significance in understanding the different market structures/forms based on nature and degree of competition. For example, under perfect competition, a firm's demand curve is parallel to ox-axis, while under monopoly and monopolistic competition, it is downward sloping to the right.

Determinants of Demand

There are various factors affecting the **demand for a commodity.**

1. Price of the good: The price of a commodity is an important determinant of demand. Price and demand are inversely related. Higher the price less is the demand and vice versa.

2. Price of related goods: The price of related goods like substitutes and complementary goods also affect the demand. In the case of substitutes, rise in price of one commodity lead to increase in demand for its substitute. In the case of complementary goods, fall in the price of one commodity lead to rise in demand for both the goods.

3. Consumer's Income: This is directly related to demand. A change in the income of the consumer significantly influences his demand for most commodities. If the disposable income increases, demand will be more.

4. Taste, preference, fashions and habits: These are very effective factors affecting demand for a commodity. When there is a change in taste, habits or preferences of the consumer, his demand will change. Fashions and customs in society determine many of our demands.

5. Population: If the size of the population is more, demand for goods will be more the market demand for a commodity substantially changes when there is change in the total population.

6. Money Circulation: More the money in circulation, higher the demand and vice versa.

7. Value of money: The value of money determines the demand for a commodity in the market. When there is a rise or fall in the value of money there may be changes in the relative prices of different goods and their demand.

8. Weather Condition: Weather is also an important factor that determines the demand for certain goods.

9. Advertisement and Salesmanship: If the advertisement is very attractive for a commodity, demand will be more. Similarly if the salesmanship and Publicity is effective then the demand for the commodity will be more.

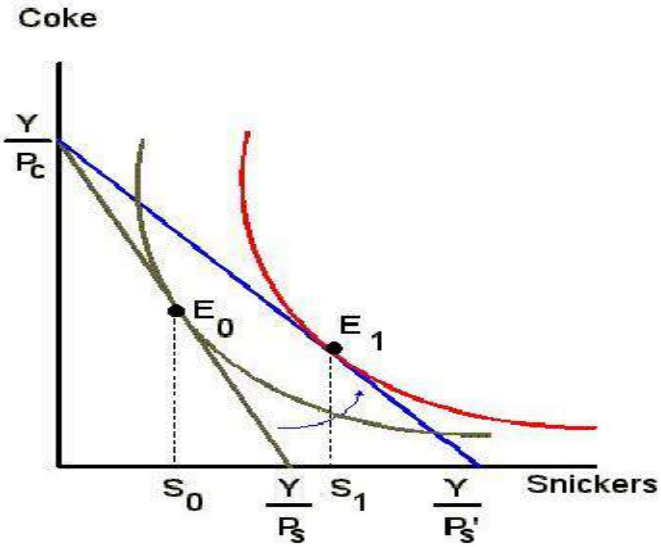
10. Consumer's future price expectation: If the consumers expect that there will be a rise in prices in future, he may buy more at the present price and so his demand increases.

11. Government policy (taxation): High taxes will increase the price and reduce demand, while low taxes will reduce the price and extend the demand.

12. Credit facilities: Depending on the availability of credit facilities the demand for commodities will change. More the facilities higher the demand.

13. Multiplicity of uses of goods: if the commodity has multiple uses then the demand will be more than if the commodity is used for a single purpose.

people to buy more potato and thus raised the demand for potato. This is against the law of demand. This is also known as Giffen paradox. So giffen goods are products that people continue to buy even at high prices due to lack of substitute products.



Fig; 2. 2. Demand curve

Types of Demand

1. Price Demand: The ability and willingness to buy specific quantities of a good at the prevailing price in a given time period.

2. Income Demand: The ability and willingness to buy a commodity at the available income in a given period of time.

3. Market Demand: The total quantity of a good or service that people are willing and able to buy at prevailing prices in a given time period. It is the sum of individual demands.

4. Cross Demand: The ability and willingness to buy a commodity or service at the prevailing price of the related commodity i.e. substitutes or complementary products. For example, people buy more of wheat when the price of rice increases.

5. Exceptional demand curve: The demand curve slopes from left to right upward if despite the increase in price of the commodity, people tend to buy more due to reasons like fear of shortages or it may be an absolutely essential good.

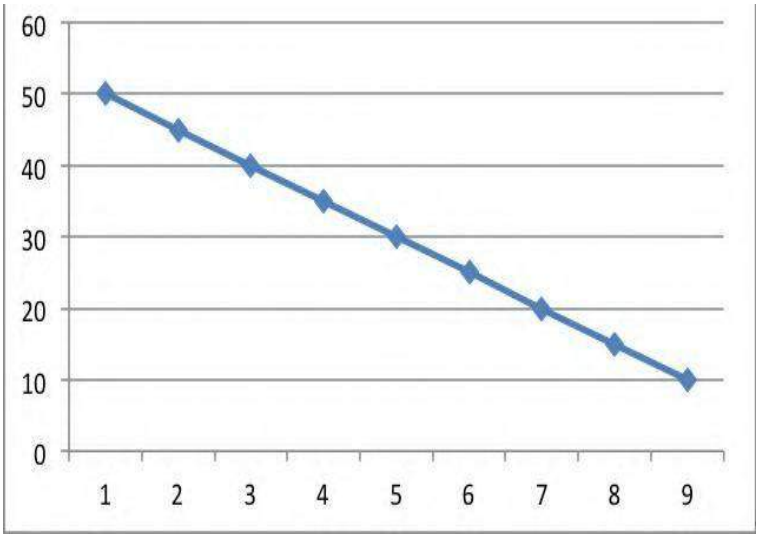


Fig: 2.3 Demand curves- (Market Demand)

Per unit Price of Commodity X (Rs)	Quantity Demanded for Commodity X by Consumer – A (Units)	Quantity Demanded for Commodity X by Consumer– B (Units)	Market Demand (Units)
P_X	Q_A	Q_B	$Q_A + Q_B$
10	6000	9000	15000
20	5000	8000	13000
30	4000	7000	11000
40	3000	6000	9000
50	2000	5000	7000
60	1000	4000	5000

Fig: 2.4.Quantity Demanded for Commodity X by Consumer

2.3 Elasticity Of Demand

In economics, the term elasticity means a proportionate (percentage) change in one variable relative to a proportionate (percentage) change in another variable. The quantity demanded of a good is affected by changes in the price of the good, changes in price of other goods, changes in income and changes in other factors.

Elasticity is a measure of just how much of the quantity demanded will be affected due to a change in price or income. Elasticity of Demand is a technical term used by economists to describe the degree of responsiveness of the demand for a commodity due to a fall in its price. A fall in price leads to an increase in quantity demanded and vice versa.

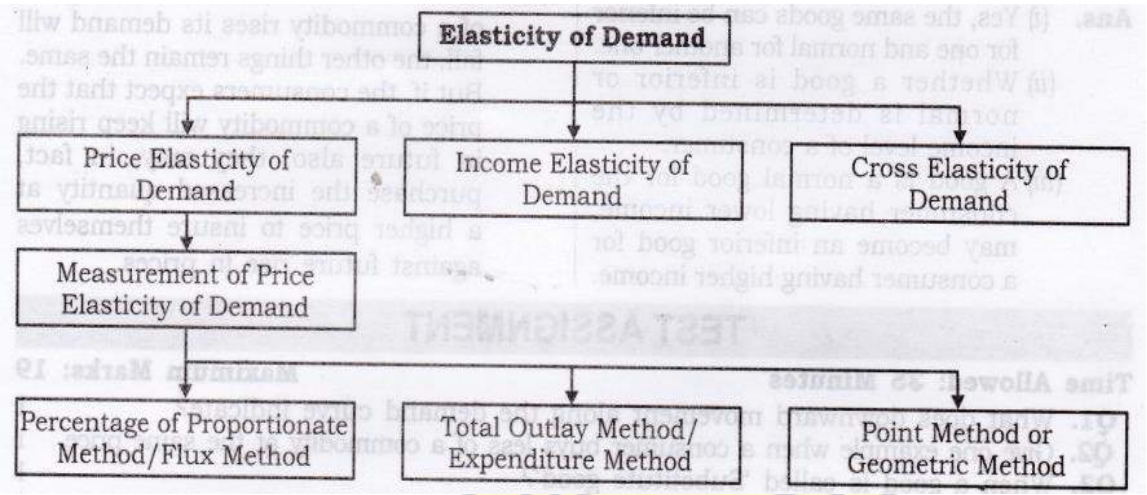


Fig: 2.5. Types of Elasticity of Demand2.4.

Types and Significance of Elasticity of Demand -

- **Price Elasticity**
- **Income Elasticity and**
- **Cross Elasticity**

1. Price Elasticity

The response of the consumers to a change in the price of a commodity is measured by the price elasticity of the commodity demand. The responsiveness of changes in quantity demanded due to changes in price is referred to as price elasticity of demand. The price elasticity of demand is measured by dividing the percentage change in quantity demanded by the percentage change in price.

Price Elasticity = Proportionate change in the Quantity Demanded / Proportionate change in price

$$= \frac{\text{Percentage change in quantity demanded}}{\text{Percentage change in price}}$$

$$= \frac{\Delta Q / Q}{\Delta P / P} \quad \frac{10}{20} \quad 0.5$$

ΔQ = change in quantity demanded

ΔP = change in price

P = price

Q = quantity demanded

The exact value of price elasticity for a commodity is determined by a wide variety of factors. The two factors considered by economists are the **availability of substitutes** and **time**. The better the substitutes for a product, the higher the price elasticity of demand.. The longer the period of time, the more the price elasticity of demand for that product. The price elasticity of necessary goods will have lower elasticity than luxuries.

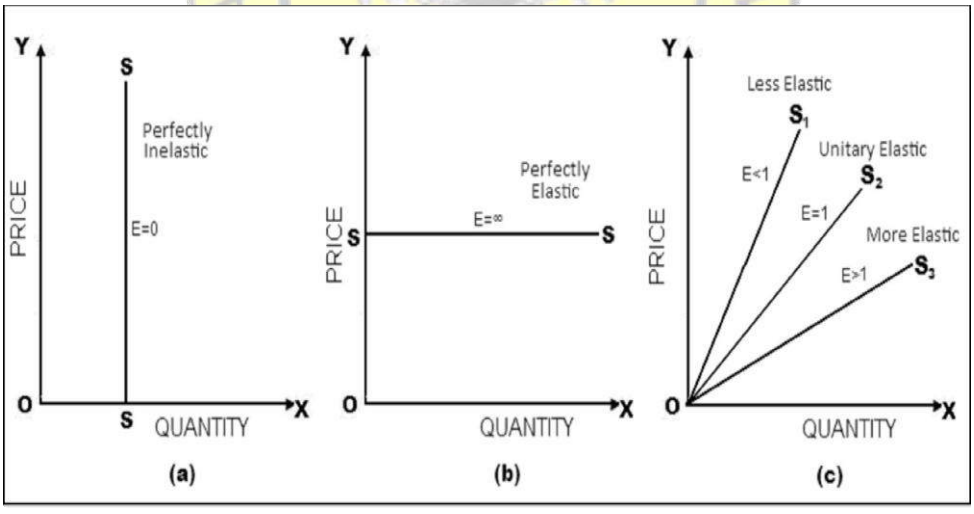


Fig: 2.6. Nature of Elasticity of demand

The elasticity of demand depends on the following factors:

1. Nature of the commodity: The demand for necessities is inelastic because the demand does not change much with a change in price. But the demand for luxuries is elastic in nature.

2. Extent of use: A commodity having a variety of uses has a comparatively elastic demand.

3. Range of substitutes: The commodity which has more number of substitutes has relatively elastic demand. A commodity with fewer substitutes has relatively inelastic demand.

4. Income level: People with high incomes are less affected by price changes than people with low incomes.

5. Proportion of income spent on the commodity: When a small part of income is spent on the commodity, the price change does not affect the demand therefore the demand is inelastic in nature.

6. Urgency of demand / postponement of purchase: The demand for certain commodities are highly inelastic because you cannot postpone its purchase. For example medicines for any sickness should be purchased and consumed immediately.

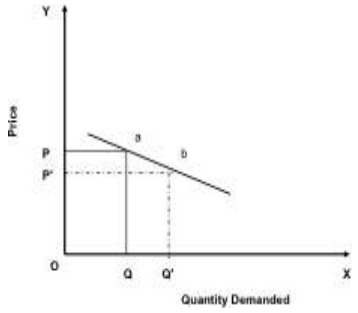
7. Durability of a commodity: If the commodity is durable then it is used it for a long period. Therefore elasticity of demand is high. Price changes highly influences the demand for durables in the market.

8. Purchase frequency of a product/ recurrence of demand: The demand for frequently purchased goods are highly elastic than rarely purchased goods.

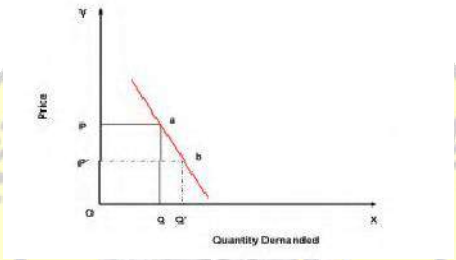
9. Time: In the short run demand will be less elastic but in the long run the demand for commodities are more elastic.

Consumer behavior theory rests upon three basic assumptions regarding the utility tied to consumption.

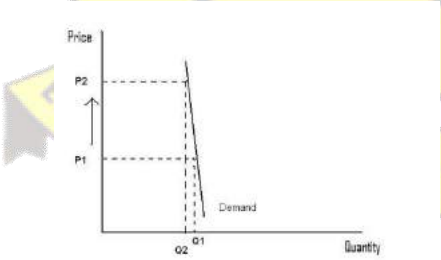
1. Relatively Elastic Demand (Ed >1) a small percentage change in price leading to a larger change in Quantity demanded.



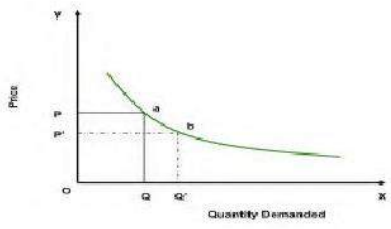
2. Perfectly Elastic Demand (Ed = ∞) a small change in price will change the quantity demanded by an infinite amount.



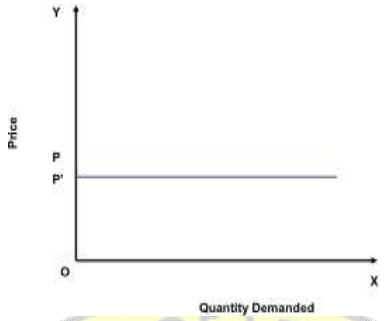
3. Relatively Inelastic Demand (Ed < 1) a change in price leads to a smaller percentage change in quantity demanded.



4. Perfectly Inelastic Demand (Ed = 0) the quantity demanded does not change regardless of the percentage change in price.



5. Unit Elasticity of Demand (Ed =1) the percentage change in quantity demanded is the same as the percentage change in price that caused it.



2. <u>Income Elasticity</u>

Income elasticity of demand measures the responsiveness of quantity demanded to a change in income. It is measured by dividing the percentage change in quantity demanded by the percentage change in income. If the demand for a commodity increases by 20% when income increases by 10% then the income elasticity of that commodity is said to be positive and relatively high. If the demand for food were unchanged when income increases, the income elasticity would be zero. A fall in demand for a commodity when income rises results in a negative income elasticity of demand.

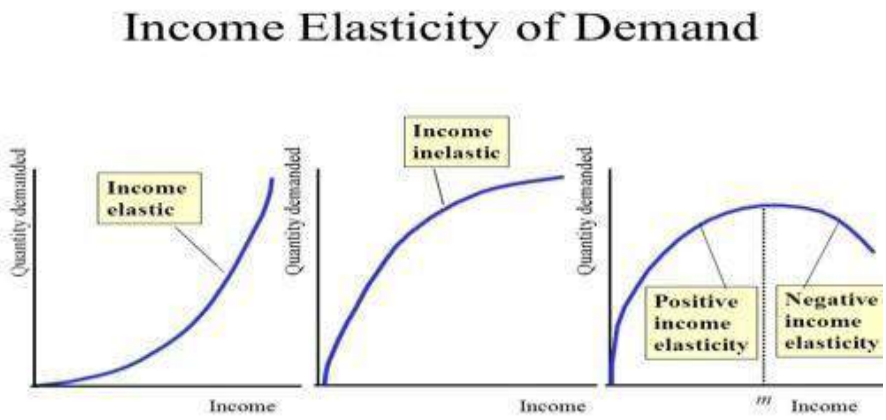


Fig: 2.7. Income elasticity

The following are the various types of income elasticity:

Zero Income Elasticity: The increase in income of the individual does not make any difference in the demand for that commodity. (Ei = 0)

Negative Income Elasticity: The increase in the income of consumers leads to less purchase of those goods. (Ei < 0).

Unitary Income Elasticity: The change in income leads to the same percentage of change in the demand for the good. (Ei = 1).

Income Elasticity is Greater than 1: The change in income increases the demand for that commodity more than the change in the income. (Ei > 1).

Income Elasticity is Less than 1: The change in income increases the demand for the commodity but at a lesser percentage than the change in the Income. (Ei < 1).

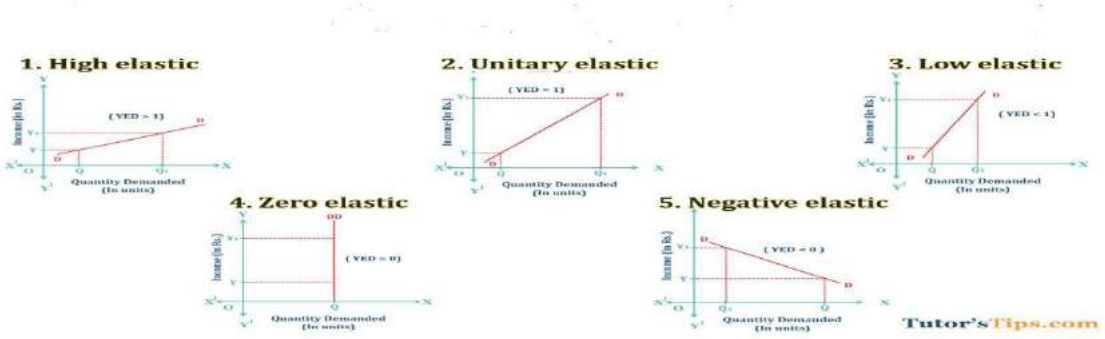


Fig: 2.8 Types of elastic demand

3. Cross Elasticity

The quantity demanded of a particular commodity varies according to the price of other commodities. Cross elasticity measures the responsiveness of the quantity demanded of a commodity due to changes in the price of another commodity. For example the demand for tea increases when the price of coffee goes up. Here the cross elasticity of demand for tea is high. If two goods are substitutes then they will have a positive cross elasticity of demand. In other words if two goods are complementary to each other then negative income elasticity may arise.

Demand is also influenced by prices of other goods and services.

- The responsiveness of quantity demanded to changes in price of other goods is Measured by cross elasticity, which is defined as the % change in the quantity? Demanded of one good caused by a 1% change in the price of some other good.
- For large changes in the price of Y, Arc cross elasticity is used.
- Point cross elasticity are analogous to the point elasticity
- Cross price elasticity for Substitutes: Negative
- Cross price elasticity for complementary goods is: Positive

Cross Elasticity and Decision Making

Many large corporations produce several related products. Gillette makes both razors and razor blades. Kinetic sells several competing makes of automobiles. Where a company's products are related, the pricing of one good can influence the demand for another Information regarding cross elasticity's can aid decision-makers in assessing such impacts. Cross elasticity are also useful in establishing boundaries between the industries. The responsiveness of the quantity of one commodity demanded to a change in the price of another good is calculated with the following formula.

$$Ec = \frac{\%\text{ change in demand for commodity A}}{\%\text{ change in price of commodity B}} -$$

If two commodities are unrelated goods, the increase in the price of one good does not result in any change in the demand for the other goods.

Marginal Utility-Marginal utility measures the added satisfaction derived from a one unit increase in consumption of a particular good or service, holding consumption of other goods and services constant. The relationship between demand and marginal utility can explain the behavior of demand in relation to price.

Law of Diminishing Marginal Utility-The law of diminishing marginal utility states that ―as an individual increases consumption of a given product within a set period of time, the managerial utility gained from consumption eventually declines. In fact, the law of demand is based on the law of diminishing marginal utility. According to law of Diminishing Marginal utility, a consumer tries to equalize marginal utility of a commodity with its price so that his satisfaction is maximized.

Equilibrium of the consumer- The simple model of a single commodity X. the consumer can either buy X or retain his money income Y. Under these conditions, the consumer is in equilibrium when the marginal utility of X is equated to its market price (PX).

Symbolically we have,

MUX = PX

2.5. Demand Estimation

Simple Demand Curve Estimation

For simple Linear Demand Curves, the best estimation method balances marginal costs and marginal benefits. This means simple linear relations are often useful for demand estimation as straight-line relations can give useful approximations.

The identification problem

The demand curve for a commodity is generally estimated from market data on the quantity purchased of the commodity at various prices over time (i.e., using time series data) or for various consuming units or markets at one point in time (i.e., using cross-section data). However, simply joining the price-quantity observations on a graph does not generate the demand curve for the commodity.

The reason is that each price-quantity observation is given by the intersection of a different (but unobserved), demand and supply curve of the commodity.

2.6. Marketing Research Approach to Demand Estimation

Although Regression analysis is by far the most useful method of estimating demand, marketing research approaches are also used. The most important of these are:

- **Consumer Interviews (or survey)**
- **Consumer Clinic**
- **Market Experiments**

Consumer Interviews or Surveys

Surveys involve questioning a sample of consumers about how they would respond to particular changes in the price of the commodity, incomes, and the price of related commodities, advertising expenditures, credit incentives, and other determinants of demand. These surveys can be conducted by simply stopping and questioning people at a shopping center or by administering sophisticated questionnaires to a carefully constructed representative sample of consumers by trained interviewers.

KFC and MacDonald use a Lickert scale of 5 about: and the choices are as follows:

a) Food quality

b) Cleanliness

c) Service

d) Atmosphere

e) Staff Behavior

And the choices are as follows:

i. Excellent

ii. Good

iii. Fairly good

iv. Satisfactory

v. Poor

Regression Analysis-A **statistical relation** exists between two economic variables if the average of one is related to another, but it is impossible to predict with certainty the value of one based on the value of another. Sometimes it would be less. In such circumstances, a statistical relation exists between total costs and output. When a statistical relation exists, the exact or "true" relation between two economic variables is not known with certainty and must be estimated. Perhaps the most common means for doing so is to gather and analyze historical data on the economic variables of interest.

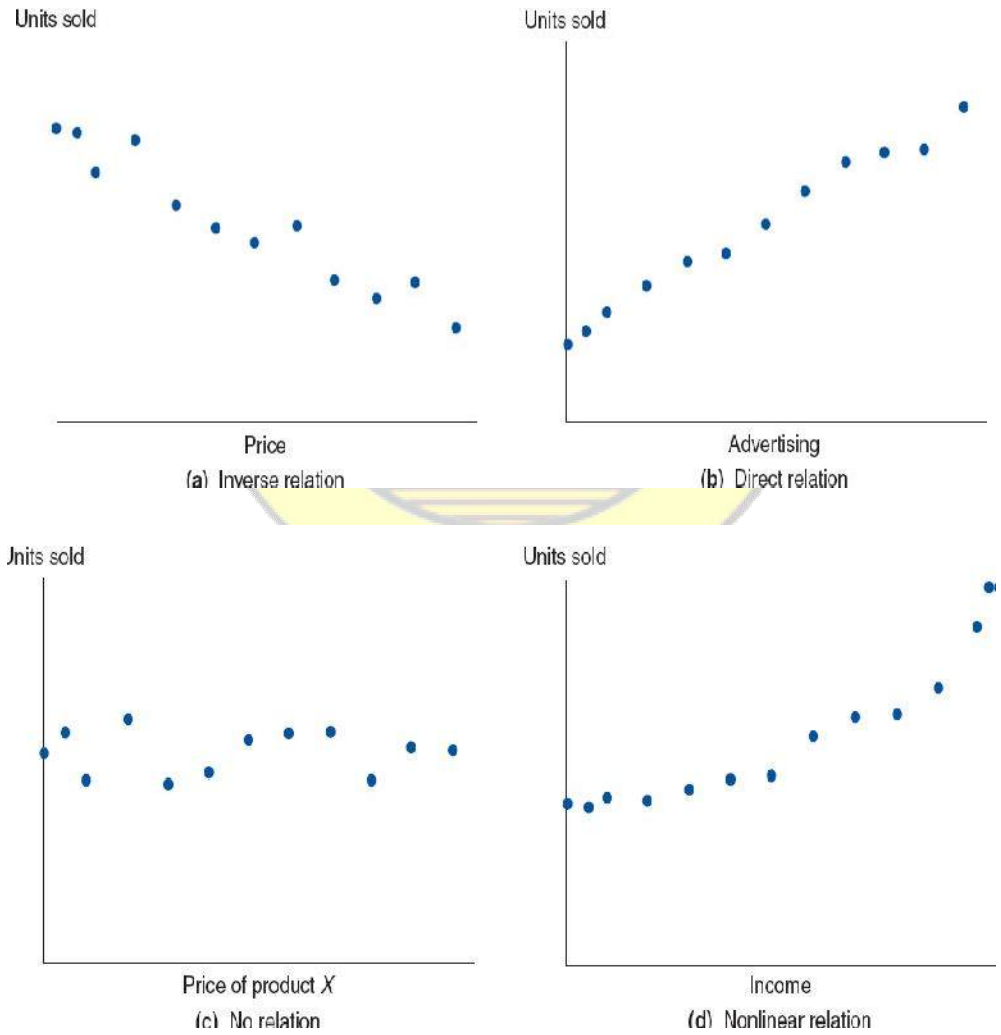


Fig: 2.10.Market Approach to Demand Estimation

2.7. Demand Forecasting

All organizations operate in an atmosphere of uncertainty but decisions must be made today that affect the future of the organization. There are various ways of making forecasts that rely on logical methods of manipulating the data that have been generated by historical events. A forecast is a prediction or estimation of a future situation, under given conditions. Demand forecast will help the manager to take the following decisions effectively

The steps to be followed:

a. **Identification of objectives**
b. **Nature of product and market**
c. **Determinants of demand**
d. **Analysis of factors**
e. **Choice of technology**
f. **Testing the accuracy**

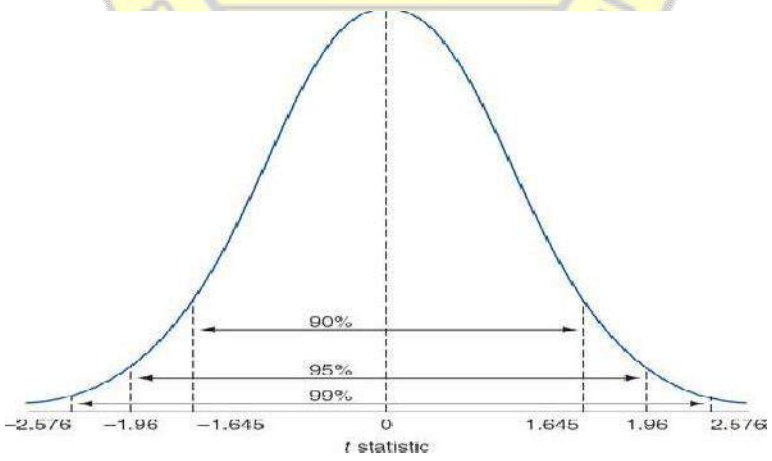


Fig: 2.11.statistical method of Demand forecast

Criteria to choose a method of forecasting are:

Accuracy

Plausibility

Durability

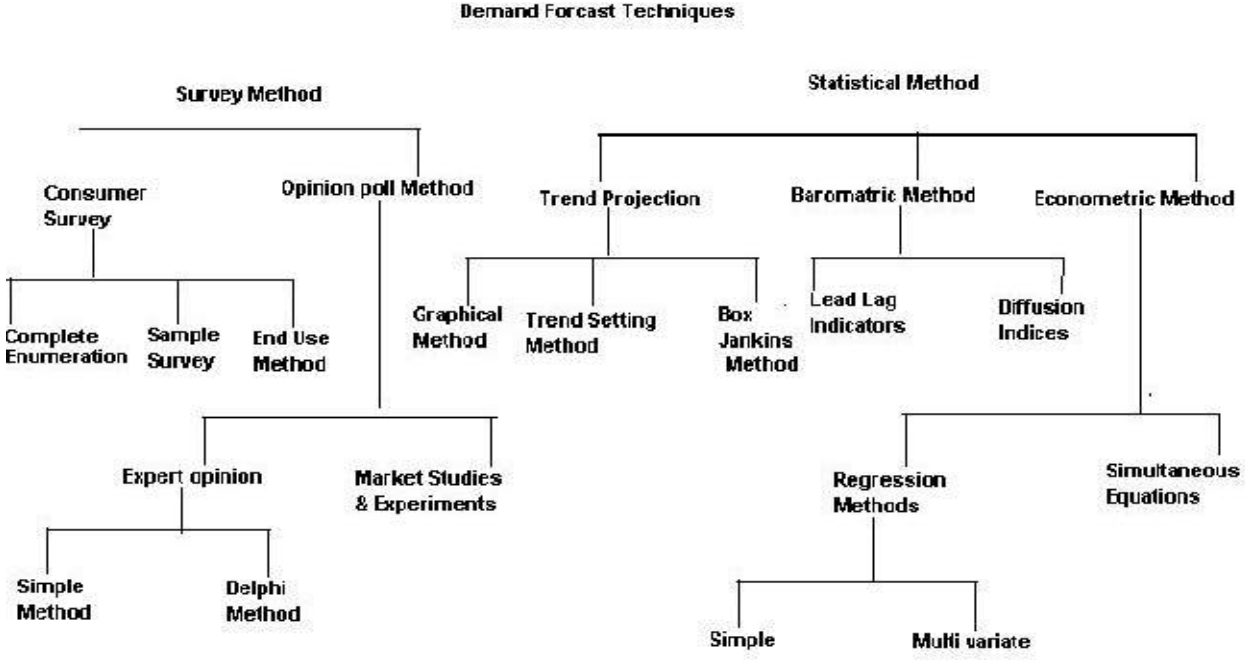
Flexibility

Availability

The following are needed for demand forecasting:

- **Appropriate production scheduling**
- **Suitable purchase policy**
- **Appropriate price policy**
- **Setting realistic sales targets for salesmen**
- **Forecasting financial requirements**
- **Business planning**
- **Financial planning**
- **Planning man-power requirements**

Demand Forecasting Methods



NEED FOR FORECASTING

Demand forecasting reduces risk related to business activities and helps it to take efficient decisions. For firms having production at the mass level, the importance of forecasting had increased more. A good forecasting helps a firm in better planning related to business goals.

Forecasting Techniques-Approaches to forecasting

1. **Qualitative forecasting** is based on judgments expressed by individuals or groups
2. **Quantitative forecasting** utilizes significant amounts of data and equations ,Quantitative techniques can be native or causal.
3. **Native forecasting** projects past data into the future without explaining future trends.
4. **Causal or explanatory** forecasting attempts to explain the functional relationships between the variable to be estimated **(the dependent variable)**and the variable or variables that are responsible for the changes

(the independent variable).

The most commonly applied forecasting techniques can be divided into the following broad categories:

Qualitative analyses
Time-Series Analysis
Trend analysis and projection
Exponential smoothing
Econometric methods

The best forecast methodology for a particular task depends on the nature of the forecasting problem. When making a choice among forecast methodologies, a number of important factors must be considered. It is always worth considering the distance into the future that one must forecast, the lead time available for making decisions, the level of accuracy required, and the quality of data available for analysis, the stochastic or deterministic nature of forecast relations, and the cost and benefits associated with the forecasting problem.

Qualitative Analysis

Qualitative Analysis includes:

1. **Expert Opinion or Opinion Poll**
2. **Survey Techniques**

1. <u>Expert Opinion or Opinion Poll</u>

Expert Opinion or Opinion Poll can be further categorized as follows:

i. Executive polling or expert opinion: The firm can poll its top management from its sales, production, finance, and personnel departments on their views on the sales outlook for the firm during the next quarter or year. Although these personal insights are to a large extent subjective, by averaging the opinions of the experts who are most knowledgeable about the firm and its products, the firm hopes to arrive at a better forecast than would be provided by these experts individually. The most basic form of qualitative analysis forecasting is **personal insight**, in which an informed individual uses personal or company experience as a basis for developing future expectations. Although this approach is subjective, the reasoned judgment of informed individuals often provides valuable insight. When the informed opinion of several individuals is relied on, the approach is called forecasting through **panel consensus**. The panel consensus method assumes that several experts can arrive at forecasts that are superior to those that individuals generate. Direct interaction among experts can help ensure that resulting forecasts embody all available objective and subjective information. Although the panel consensus method often results in forecasts that represent the collective wisdom of Consulted experts, it can be unfavorably affected by the forceful personality of one or a few key individuals. A related approach, the

delphi method, has been developed to counter this disadvantage. In the delphi method, members of a panel of experts individually receive series of questions relating to the underlying forecasting problem.

Responses are analyzed by an independent party, who then tries to draw a consensus

opinion by providing feedback to panel members in a manner that prevents direct identification of individual positions. To avoid a bandwagon effect (whereby the opinions of some experts might be overshadowed by some dominant personality in their midst), the Delphi method is used.

ii. Sales force polling: This is a forecast of the firm's sales in each region and for each product line; it is based on the opinion of the firm's sales force in the field. These are the people closest to the market, and their opinion of future sales can provide valuable information to the firm's top management.

iii.Consumer intentions polling: Companies selling automobiles, furniture, household appliances, and other durable goods sometimes poll a sample of potential buyers on their purchasing intentions. Using the results of the poll, the firm can fore

2. <u>Survey Techniques</u>

Survey techniques that skillfully use interviews or mailed questionnaires are an important forecasting tool, especially for short-term projection. Designing surveys that provide unbiased and reliable information is a challenging task. When properly carried out, however, survey research can provide managers with valuable information that would otherwise be unobtainable. Surveys generally use interviews or mailed questionnaires that ask firms, government agencies, and individuals about their future plans. Businesses plan and budget virtually all their expenditures in advance of actual purchase or production decisions. Surveys asking about capital budgets, sales budgets, and operating budgets can thus provide useful forecast information. Government departments that prepare formal budgets also provide a wealth of information to the forecaster. Finally, because individual consumers routinely plan expenditures for such major items as automobiles, furniture, housing, vacations, and education, surveys of consumer intentions often accurately predict future spending on consumer goods.

Survey information may be all that is available in certain forecasting situations, as, for example, when a firm is attempting to project new product demand. Although surveys sometimes serve as an alternative to quantitative forecasting techniques, they frequently supplement rather than replace quantitative analysis. Quantitative models generally assume stable consumer tastes. If tastes are actually changing, survey data can suggest the nature and direction of such changes.

IMPORTANT QUESTIONS

1. Enumerate on need for forecasting and different forecasting techniques.

2. Explain the different types of elasticity of demand with suitable examples.

3. Briefly explain the significance of demand forecasting and narrate various techniques.

4. Discuss the role of marketing research approaches in demand forecasting.

5. Categories the types of demands. Explain with an example.

6. What is meant by demand forecasting? Why do you think it is important for the manager of a business firm?

7. Narrate statistical demand forecasting techniques.

UNIT-3
PRODUCTION ANALYSIS

3.1. Production Function:

Production is a function of land, labor, capital and organization. The mangers will have to procure the right level of these factors based on factors like diminishing marginal utility economies of large scale operations, law of return, scales etc., with a view of maximizing the output with minimum cost so as to earn larger profit to the firm/industry. Production is an important economic activity which satisfies the wants and needs of the people. Production function brings out the relationship between inputs used and the resulting output. A firm is an entity that combines and processes resources in order to produce output that will satisfy the consumer's needs. The firm has to decide as to how much to produce and how much input factors (labor and capital) to employ to produce efficiently. This chapter helps to understand the set of conditions for efficient production of an organization.

Definition of production

"Production is a process by which goods and services are created**"**

-Edwood Buffa

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

-James bates and J.R. Parkinson,"

Meaning of production -Production analysis or theory of production deals with a relationship between input factors and output the operational efficiency for optimum output and cost of production is not considered.

Factors of production

Production requires the use of certain resources. Each particular resource may be called a factor of production. Anything that contributes towards output is a factor of production. For the sake of convenience it is usual to group all productive resources fewer than four heads land labor capital and organization each group being called a factor of production.

- **Land**
- **Labor**
- **Capital**
- **Entrepreneurship**

The level of production depends upon both the quantity of inputs and the efficiency with which they are employed in the process of production. It is also noteworthy that economic growth of a country, in a way, represents its productive capacity which, in turn, depends upon the technology and amounts of productive resources.

LAND:

Land is not created by mankind but it is a gift of nature available to us free of cost. So, it is called as **natural factor of production.** It is also called as original or primary factor of production. Normally, land means surface of earth. But in economics, land has a wider meaning. Land includes earth's surface and resources above and below the surface of the earth. It includes following natural resources :-

- **On the surface (e.g. soil, agricultural land, etc.)**
- **Below the surface (e.g. mineral resources, rocks, ground water, etc.)**
- **Above the surface (e.g. climate, rain, space monitoring, etc.)**

Land is the sum total of those productive resources which are provided 'free of cost' by nature to us that is to say those resources on which no human effort has been expended to make them actually usable in a productive process

The salient features of land are highlighted below.

- Land is a free gift of nature to mankind. It is not a man-made factor but is a natural factor.
- Land is primary factor of production.
- Supply of land is perfectly inelastic i.e. fixed in quantity. Neither it can be increased nor decreased.
- Land is a passive factor in the sense that it cannot produce anything of its own. It needs help of Labor, Capital, Entrepreneur, etc.
- There is no social cost of land since; it is a gift of nature to society. It is not created by society by putting any efforts and paying any price. So its supply price for society is zero. At the same time, the supply price for individual is not zero.
- Land is a perfectly immobile factor.
- Economic reward for the use of land is rent.

Land is not created by mankind but it is a gift of nature available to us free of cost. So, it is called as natural factor of production. It is also called as original or primary factor of production. Normally, land means surface of earth. Land includes earth's surface and resources above and below the surface of the earth. It includes following natural resources. The term is used in different sense in economics. It does not mean soil or earth's surface alone but refers to all free gift of nature which would include besides the land in common parlance natural resources fertility of soil water air natural vegetation etc.

Labor:

The term labour is used to mean several things and can be a source of great deal of vagueness and imprecise statements. The term labour refers to only human effort (or activity) which can be physical mental or a mixture of the two. It does not include the workperformed by animals or machines or nature.

(i) Duration of time over which it is performed and

(ii) The intensity with which it is

performed.Supply of labour in a country

refers to

- **the total number of workers available for labour**
- **the intensity with which they can work**
- **the duration for which they work**
- **their efficiency (or productivity)**

Capital: Capital is another important factor which plays a huge role in the production. Capital includes things like tools, machines, and other things that a business uses in order to produce their goods or services. At some level, all companies rely on their capital in order to run successfully. Without these things, the company would be unable to carry out production. The term Capital may mean different in different disciplines; in economics, capital is that part of wealth which is used for production. It is one of the factors of production/ input. The word capital in economics may mean either of the three;

Assets

Money/

wealth

Income

The salient features of capital are highlighted below.

- Capital is not a gift of nature. It is manmade, secondary as well as an artificial factorof production.
- Capital helps in increasing level of productivity and speed of production.
- Supply of capital is relatively elastic.
- Capital is not perishable like labour. It has a long life subject to periodical depreciation.
- Capital is a perfectly mobile factor.
- Capital has a social cost. Capital as a resource has alternative uses. It can be put to either of the uses.

  The society in order to have one of them sacrifices another; accounting it as social cost.

Capital may be defined as that part of wealth of an individual or community which is usedfor further production of wealth. In fact capital is a stock concept which yields as produced means of production.

Entrepreneur: Factors of production viz. land, labour and capital are scattered at different places. These cannot produce economic goods and services by themselves. They have to be brought together and, in a coordinated way, made to pass through a productive process to create output. All these factors have to be assembled together. This work is done by enterprise through entrepreneur. This is the function of an entrepreneur; to bring the required factors together and making them work harmoniously.

This final factor of production of entrepreneurship involves the activity right from start ofthe business to assembling of other factors in order to carry out production smoothly. It isnot possible for an entrepreneur to start production process without other factors of production viz. land, labour, capital. Entrepreneurship is an

independent factor of production.

The salient features of an entrepreneur as a factor of production are highlighted below.

- Entrepreneur should be able to plan, organize, manage and allocate other primaryfactors of production efficiently.
- Entrepreneur should be able to define objective precisely.
- Entrepreneur should be able to deal with numerous risks involved in entrepreneurship.
- Entrepreneur should be able to incorporate innovation and adopt modern techniquesof production.
- Entrepreneur should be able to take decisions promptly. Quick decisions are expected but hasty decisions may be avoided. At the same time, delay in decisions may increase cost of project and reduce the profits.

It is the factor which mobilizes the other factors land, labor, and capital; combines themin the right proportion then initiates the process of production and bears the risk involves in it. This factor is known as the entrepreneur. He has also been called the organizer, the manager or the risk taker.

PRODUCTION FUNTION:

Following are the main features of production function:

1. Substitutability:

The factors of production or inputs are substitutes of one another which make it possible to vary the total output by changing the quantity of one or a few inputs, while the quantities of all other

inputs are held constant. It is the substitutability of the factors of production that gives rise to the laws of variable proportions.

2. Complementarity:

The factors of production are also complementary to one another, that is, the two or more inputs are to be used together as nothing will be produced if the quantity of either of the inputs used in the production process is zero.

The principles of returns to scale is another manifestation of complementarity of inputs as it reveals that the quantity of all inputs are to be increased simultaneously in order to attain a higher scale of total output.

3. Specificity:

It reveals that the inputs are specific to the production of a particular product. Machines and equipment's, specialized workers and raw materials are a few examples of the specificity of factors of production. The specificity may not be complete as factors may be used for production of other commodities too. This reveals that in the production process none of the factors can be ignored and in some cases ignorance to even slightest extent is not possible if the factors are perfectly specific.

Production function states the relationship between inputs and output i.e., the amount of output that can be produced with given quantities of inputs under a given state of technical knowledge.

The output takes the form of volume of goods or services and the inputs are different factors of production i.e., land, labor, capital and enterprise.

$$\mathbf{Q_X = f\ (L, K, T\text{------}\ n)}$$

Q_X =Output

L = Labour

K = Capital

T = Level of Technology

n = Other Inputs Employed in Production

Assumptions of Production Functions

There are two types of production function –

1. Short run production function and

2. Long run production function.

Short run is defined as that time period over which a firm is unable to vary the quantities of all inputs. In the short run production function, the quantity of only one input varies while all other inputs remain constant. In contrast, long run is defined as that time period over which a firm can vary quantities of all factors of production and therefore, can switch between different scales. In the long run production function all inputs are variable. There are two alternative theories to these production functions i.e.

1. Law of Diminishing Returns or Laws of Variable Proportions (to analyze production in the short period)

2. Law of Returns to Scale (to analyze production in the long period)

The production function has following assumptions,

1. Perfect divisibility of both inputs and output
2. Limited substitution on one factor for the other.
3. The level of technology remains constant
4. Inelastic supply of fixed factors in the short run
5. It is related to specified period of time.

"An increase in the capital and labour applied in the cultivation of land causes in general a lessthan proportionate increase in the amount of product raised unless it happens to coincide with an improvement in the arts of agriculture." **-Alfered Marshall**

There are three stages to this law in the following sequence:

- **Stage of Increasing Returns**
- **Stage of Diminishing Returns**
- **Stage of Negative Returns**

Total Product or Total Physical Product (TPP): is the total quantity of output a firmobtains from a given quantity of inputs (L, K).

Average Product or Average Physical Product (APP): is the total physical product (TPP)divided by the quantity of input.

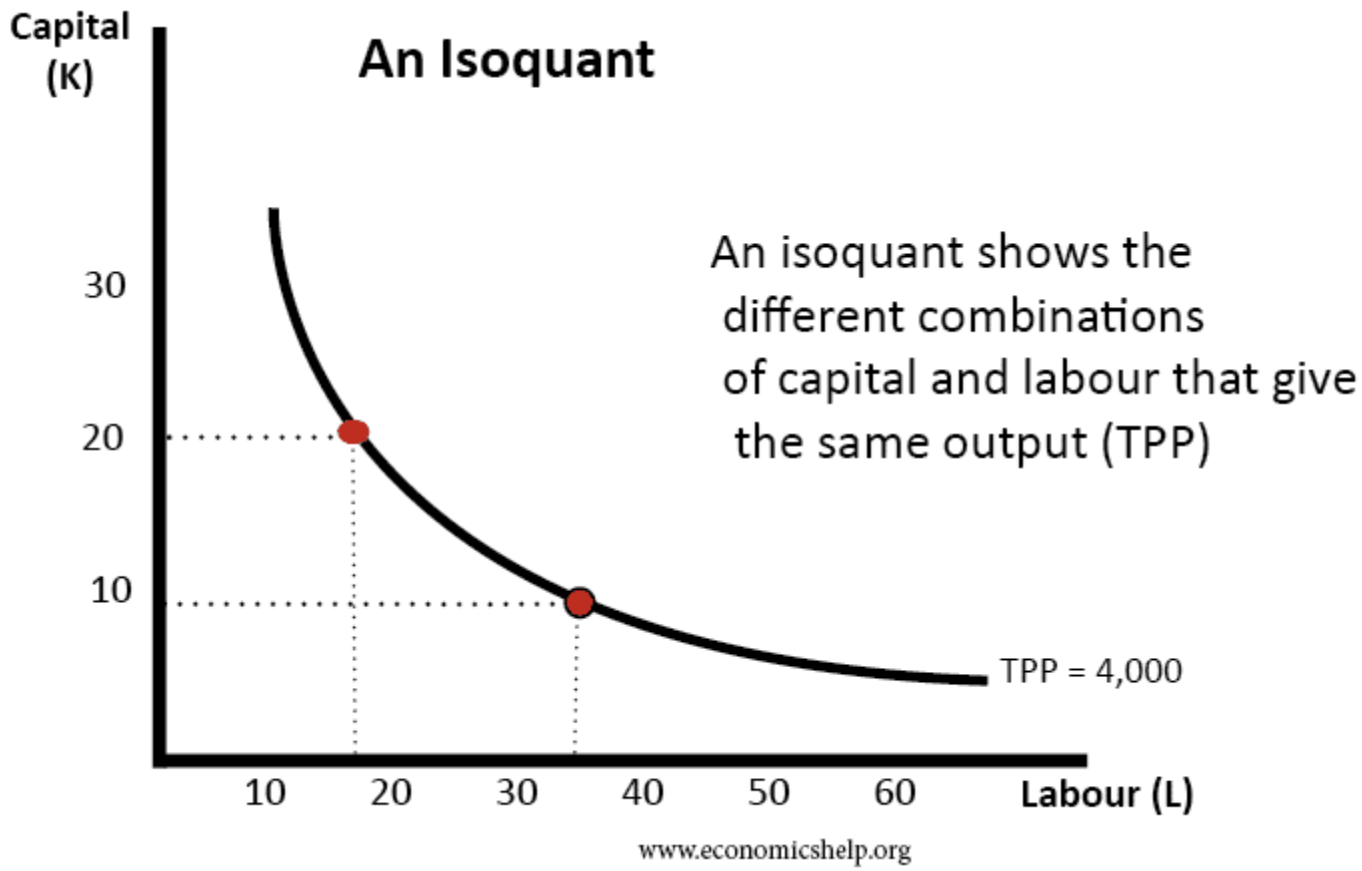
$APP_L = TPP/L$ $APP_K = TPP/K$

Marginal Product or Marginal Physical Product (MPP): It is the increase in total outputthat results from a one unit increase in the input, keeping all other inputs constant.

$MPP_L = \Delta TPP/\Delta L$ or $MPP_L = TPP_n - TPP_{n-1}$

ISOQUANTS AND ISOCOSTS:

An **isoquant** shows all combination of factors that produce a certain output. An **isocost** show all combinations of factors that cost the same amount. **Isocosts** and **isoquants** can show the optimal combination of factors of production to produce the maximum output at minimum cost.



In this diagram, the isoquant shows all the combinations of labour and capital that can produce a total output (Total Physical Product **TPP**) of 4,000. In the above isoquant, this could be

- 20 capital and 18 labour or (more capital intensive)
- 9 capital and 35 labour. (more labour intensive

An isoquant is usually shaped concave because of the law of diminishing returns. With fixed capital employing extra workers gives a declining increase in the marginal product (MP)

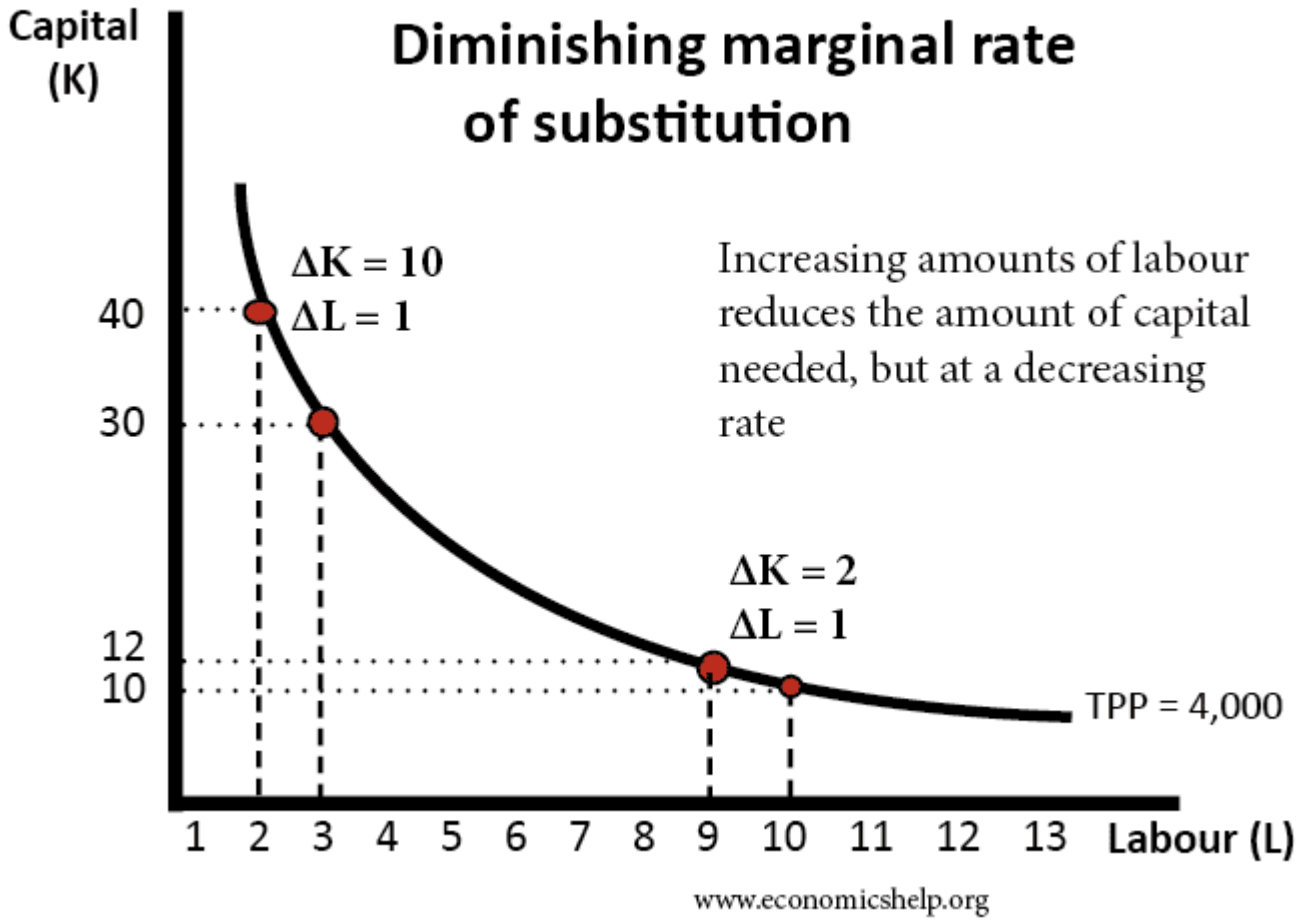
Marginal rate of factor substitution

$$MRS = \frac{\Delta K}{\Delta L}$$

The marginal rate of substitution is the amount of one factor (e.g. K) that can be replaced by one factor (e.g. L). If 2 units of capital could be replaced with one-factor labour, the MRS would be 2

$$MRS = \frac{\Delta K}{\Delta L} = \frac{2}{1} = 2$$

Diminishing marginal rate of substitution



If the firm employs 2 L and 40 K. Then employing one extra worker can enable it to save 10K. This is quite an efficient saving. The firm only has to pay one extra worker but can save the cost of 40.

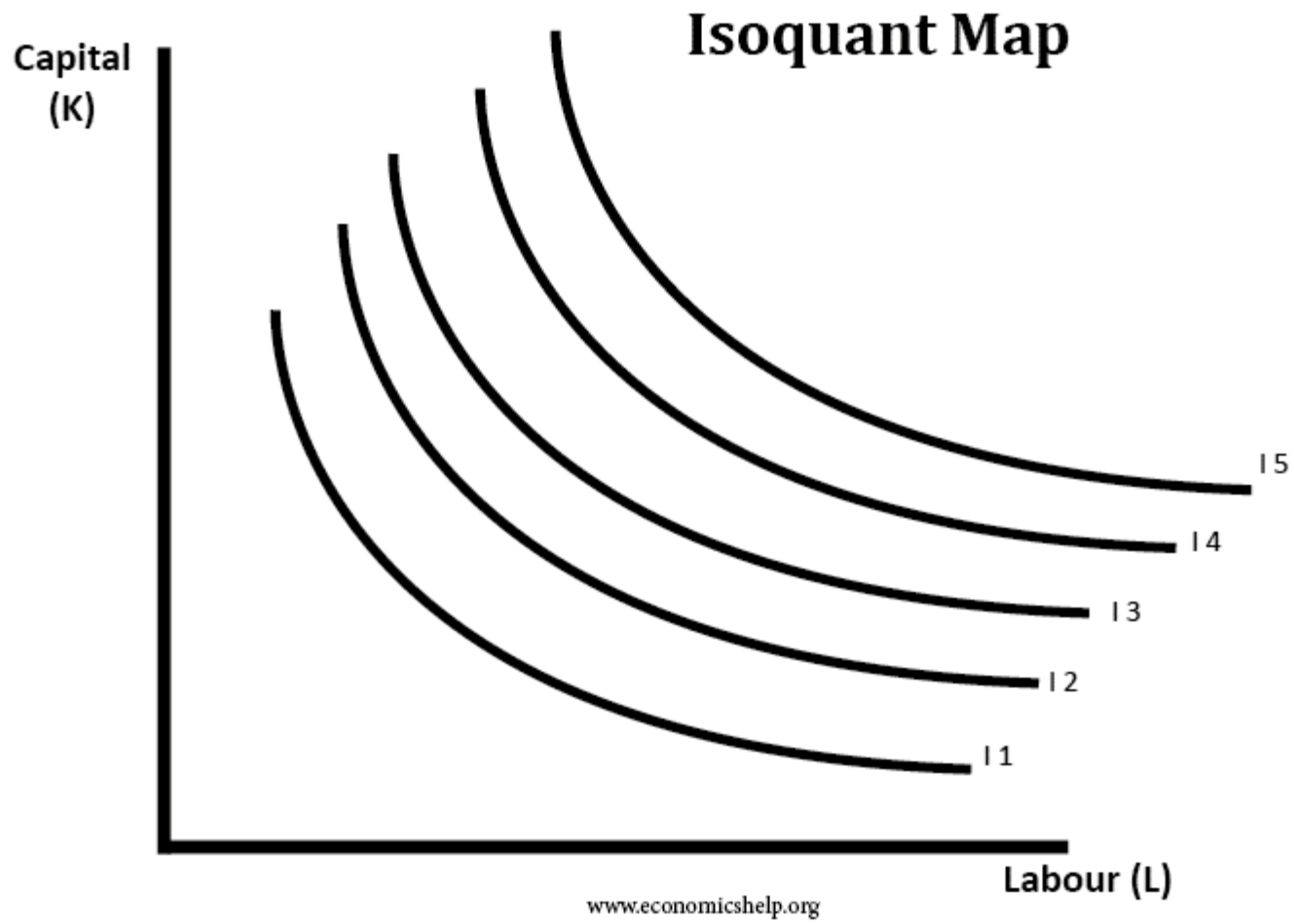
However, at a combination of 9 Labour, employing an extra worker enables a saving of only 2 capital. Therefore, the more that workers are employed, there is a diminishing rate at which you can substitute the other factor. There comes a point, where employing more workers barely saves any capital at all. This is when diminishing returns of labour is very high – workers effectively get in each other's way.

As one moves down the isoquant, output remains the same. Therefore the output gained from employing more labour must equal the output lost from employing more capital.

MPP (L) x ΔL = MPP (K) x ΔK
This equation gives us

$$\frac{MPP(L)}{MPP(K)} = \frac{\Delta K}{\Delta L} = MRS$$

Isoquant map



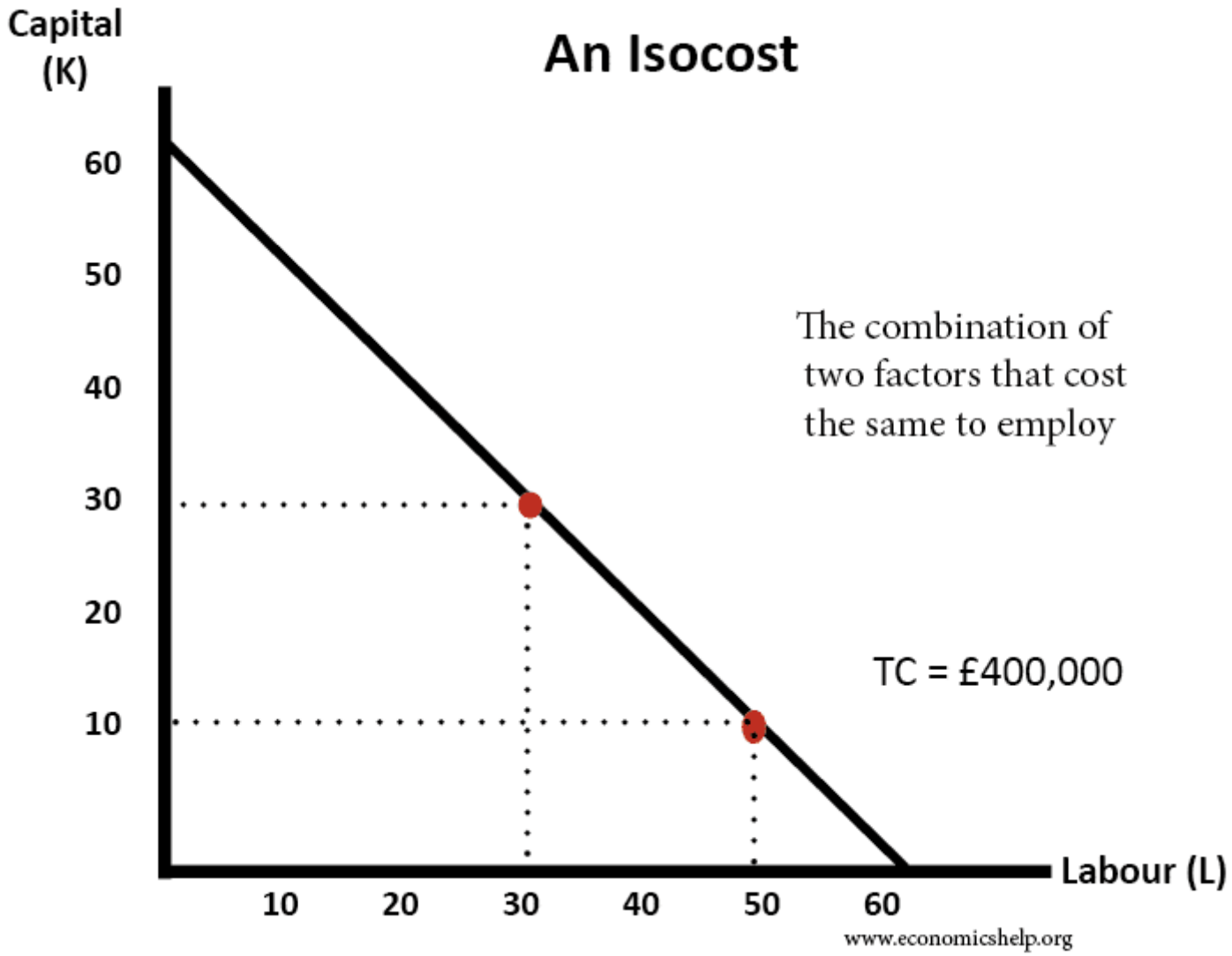
An isoquant map shows different levels of output. For example

- I1 may show the combinations of capital and labour that can produce 4,000 TPP.
- I2 may show the combinations of capital and labour that can produce 5,000 TPP.
- I5 is a higher output than I4

In the short-term, a firm faces a trade-off along one particular isoquant. But, in the long-term, a firm can invest in increasing capital stock and produce at a higher output for the same quantity of labour.

Isocost

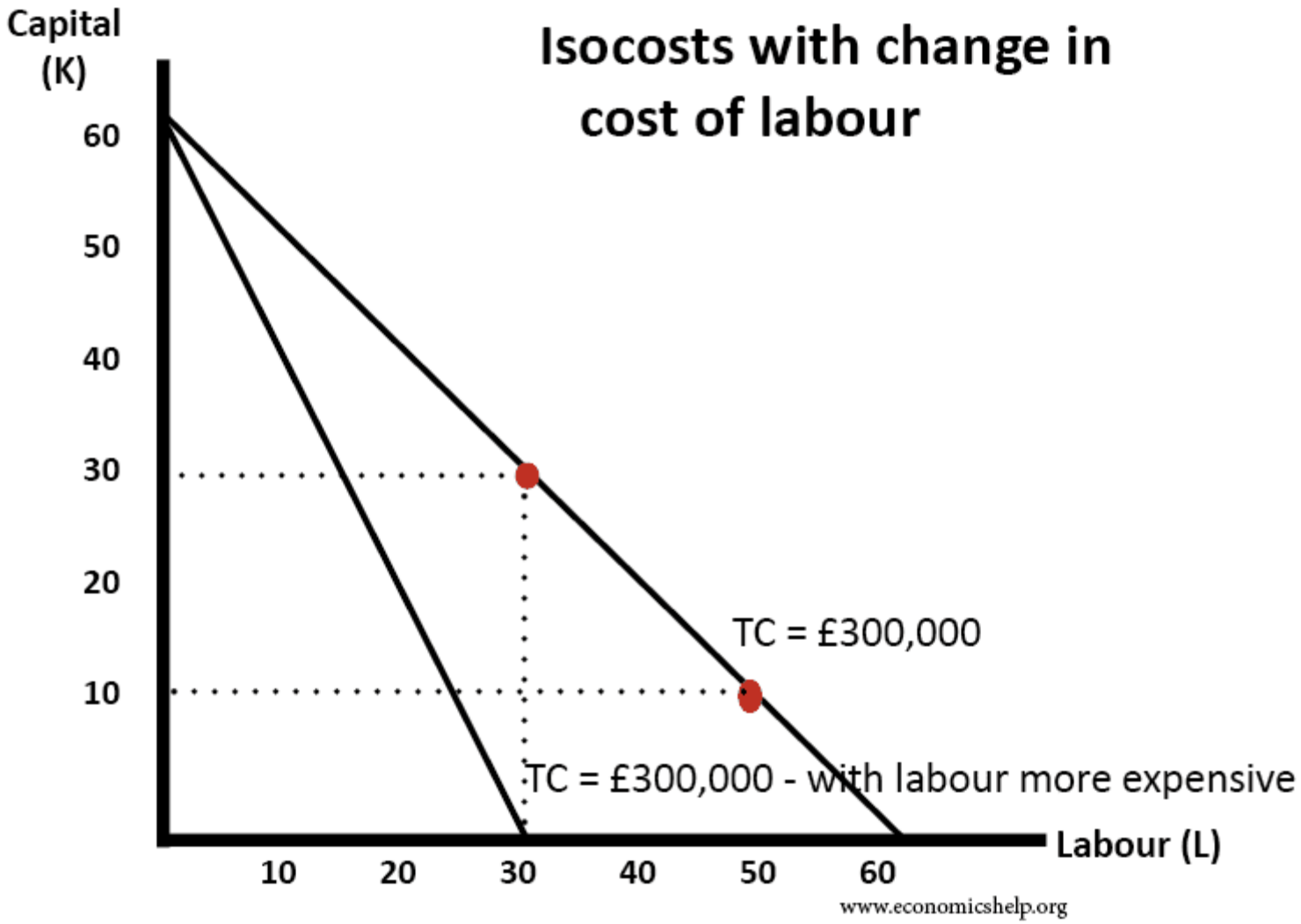
An isocost shows all the combination of factors that cost the same to employ.



In this example, a unit of labour and capital cost £6,666 each.

- If we employ 30K and 30L, the total cost will be £200,000 + £200,000
- If we employ 10 K and 50L, the total cost will be £66,666 +£333,333 = £400,000

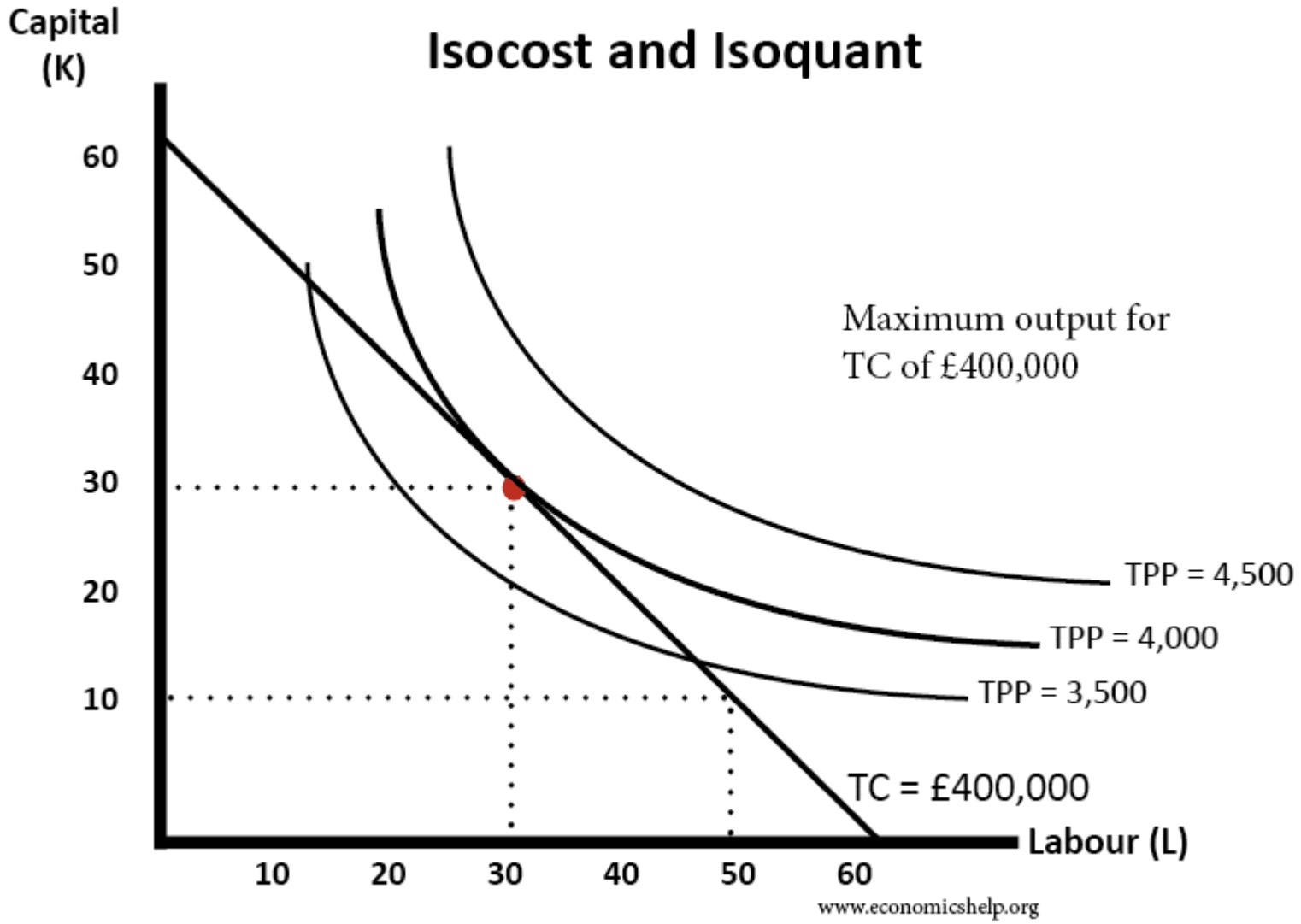
Change in labour costs



- In this example, initially, the cost of labour and capital is both £5,000. (e.g. 60L = 60 x £5,000 = £300,000)
- However, if Labour cost rises to £10,000, then the isocost shifts to the left. Now, to keep cost at £300,000, a firm could only employ 30 workers (30 x £10,000)
- The slope of an isocost is therefore P_L / P_K

Profit maximisation

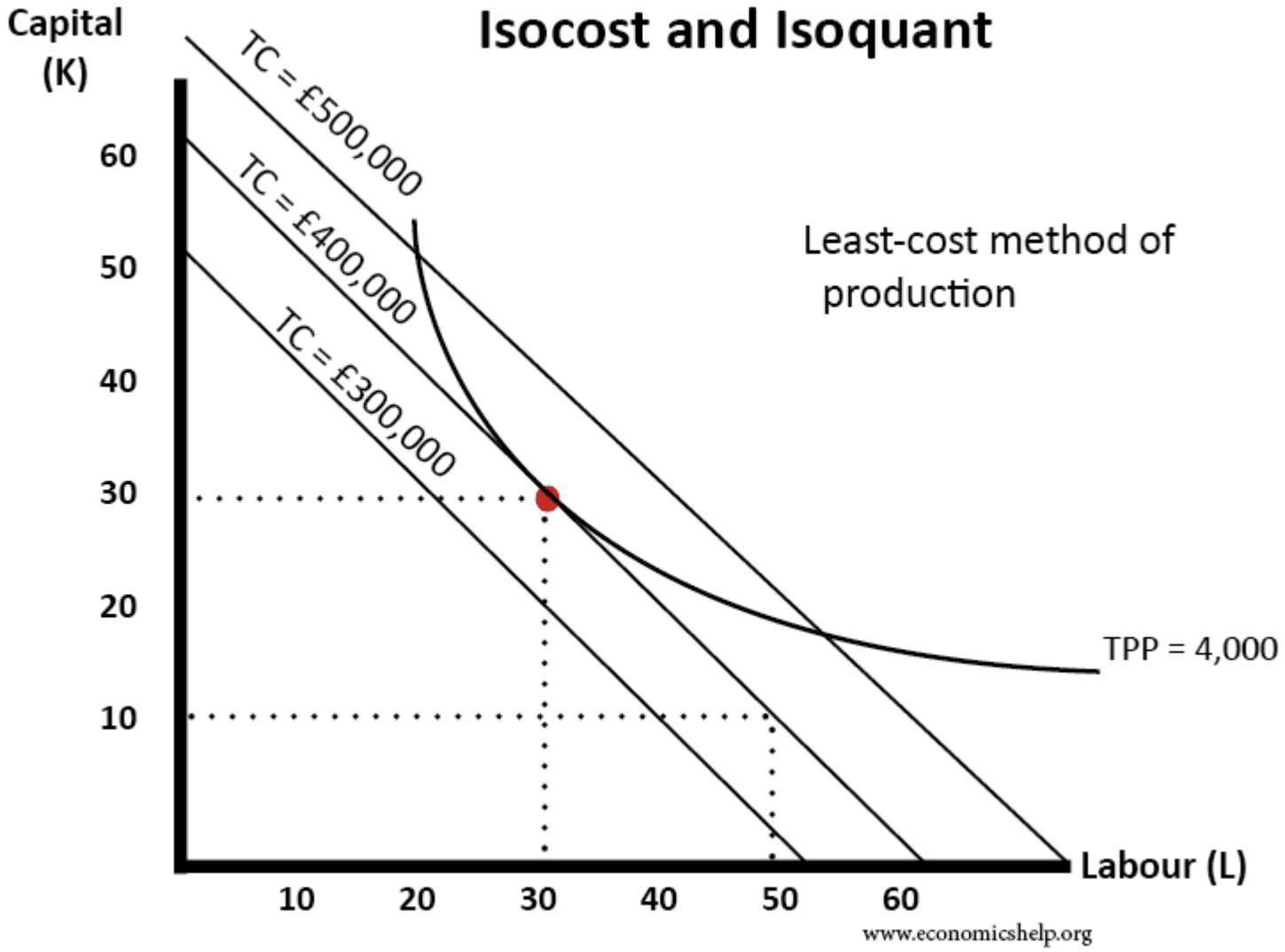
To maximise profits, a firm will wish to produce at the point of the highest possible isoquant and minimum possible isocost



In this example, we have one isocost and three isoquants. With the isocost of £400,000 the maximum output a firm can manage would be a TPP of 4,000. If it produced at say 13 K and 48 Labour, it would only be able to produce a TPP of 3,500.

A total TPP of 4,500 is currently not possible without increasing costs beyond £400,000

Profit maximisation – the least cost method of production



Another way of seeking to maximise profits is to target an output of say 4,00 and then find the isocost with the lowest possible cost. In this case, the isocost which touches the tangential point of the TPP is a TC of £400,000.

PRODUCTION FUNCTION WITH ONE/TWO VARIBLES:

Production function with one variables:

In this article we will discuss about the Production in the Short Run with One Variable Input:- 1. Total, Average and Marginal Product of a Variable Input 2. Total Product of Labour (TP_L) Curve and the Law of Variable Proportions 3. The Average Product of Labour (AP_L) and the Marginal Product of Labour (MP_L) Curves—Derivation of the AP_L and MP_L Curves from the TP_L Curve and Other Details.

Contents:

1. Total, Average and Marginal Product of a Variable Input:

Total Product:

The firm uses a number of inputs to produce its output. If the firm varies the quantity of only one input, keeping the other input quantities unchanged, then the quantity of its output obtained at any quantity of the variable input is called the total product of the input.

For example, if the said variable input is labour and if it is obtained that the firm produces 42 units of output when it uses 6 units of labour along with the fixed inputs, then we say that the total product of labour is 42 units when 6 units of labour are used.

The schedule of total product obtained at different quantities of labour used by the firm is called the total product schedule of labour—it expresses the total product of the firm (i.e., the total quantity of output) as a function of the quantity of labour used. This function is called the total product function.

Table 8.1

TP_L, AP_L and MP_L Schedules of a Firm

quantity of labour used (L) (units)	total product of labour (TP_L) (units)	average product of labour (AP_L) (units)	marginal product of labour (MP_L) (units)
(1)	(2)	(3)	(4)
1	5	5	5
2	12	6	7
3	24	8	12
4	32	8	8
5	40	8	8
6	42	7	2
7	35	5	– 7
8	24	3	– 11

Columns (1) and (2) of Table 8.1 constitute the total product schedule or total product function of labour. This function may be written as

$q = f(L)$ (8.8)

or, $TP_L = f(L)$ (8.9)

Here q or TP_L is the total product of the firm or the total product of labour and L is the quantity of labour used.

Average Product:

If we divide the total product of an input by the quantity used of it, we obtain the average product of the input. For example, if the total product of labour is 40 units per day when the firm uses 5 units of labour per day, then the average product of labour (AP_L) would be 40/5 or 8 units.

The average product schedule obtained at different quantities of labour used is called the average product schedule of labour—this schedule expresses AP_L as a function of labour. Columns (1) and (3) of Table 8.1 constitute the AP schedule of labour or the AP function of labour. We may express this function as

$AP_L = q/L = f(L)/L = g(L)$ (8.10)

Marginal Product:

Marginal product of a variable input, say, labour (MP_L), is the increment in total product of labour (TP_L) obtained as a result of the use of the marginal (or an additional) unit of labour.

For example, if the TP_L be 32 units and 40 units, respectively, when the firm uses 4 and 5 units of labour, then the marginal product of labour (MP_L) at L = 5 units would be the increment in TP_L that would be obtained as a result of the use of the 5th unit of labour, and so here we would have MP_L = 40 – 32 = 8 units.

COBB-DOUGLAS PRODUCTION FUNCTION:

In economics and econometrics, the Cobb–Douglas production function is a particular functional form of the production function, widely used to represent the technological relationship between the amounts of two or more inputs and the amount of output that can be produced by those inputs.

The below mentioned article provides a close view on the Cobb-Douglas Production Function.

The Cobb-Douglas production function is based on the empirical study of the American manufacturing industry made by Paul H. Douglas and C.W. Cobb. It is a linear homogeneous production function of degree one which takes into account two inputs, labour and capital, for the entire output of the .manufacturing industry.

The Cobb-Douglas production function is expressed as:

$Q = AL^a C^\beta$

where Q is output and L and C are inputs of labour and capital respectively. A, a and β are positive parameters where = a > O, β > O.

The equation tells that output depends directly on L and C, and that part of output which cannot be explained by L and C is explained by A which is the 'residual', often called technical change.

The production function solved by Cobb-Douglas had 1/4 contribution of capital to the increase in manufacturing industry and 3/4 of labour so that the C-D production function is

$Q = AL^{3/4} C1^{/4}$

which shows constant returns to scale because the total of the values of L and C is equal to one: (3/4 + 1/4), i.e.,(a + β = 1) . The coefficient of labourer in the C-D function measures the percentage increase in (Q that would result from a 1 per cent increase in L, while holding C as constant.

Similarly, B is the percentage increase in Q that would result from a 1 per cent increase in C, while holding L as constant. The C-D production function showing constant returns to scale is depicted in Figure 20. Labour input is taken on the horizontal axis and capital on the vertical axis.

To produce 100 units of output, OC, units of capital and OL units of labour are used. If the output were to be doubled to 200, the inputs of labour and capital would have to be doubled. OC is exactly double of OC_1 and of OL_2 is double of OL_2.

Similarly, if the output is to be raised three-fold to 300, the units of labour and capital will have to be increased three-fold. OC_3 and OL_3 are three times larger than OC_1, and OL_1, respectively.

Another method is to take the scale line or expansion path connecting the equilibrium points Q, P and R. OS is the scale line or expansion path joining these points.

It shows that the isoquants 100, 200 and 300 are equidistant. Thus, on the OS scale line OQ = QP = PR which shows that when capital and labour are increased in equal proportions, the output also increases in the same proportion.

Criticisms of C-D Production Function:

The C-D production function has been criticised by Arrow, Chenery, Minhas and Solow as discussed below:

1. The C-D production function considers only two inputs, labour and capital, and neglects some important inputs, like raw materials, which are used in production. It is, therefore, not possible to generalize this function to more than two inputs.

2. In the C-D production function, the problem of measurement of capital arises because it takes only the quantity of capital available for production. But the full use of the available capital can be made only in periods of full employment. This is unrealistic because no economy is always fully employed.

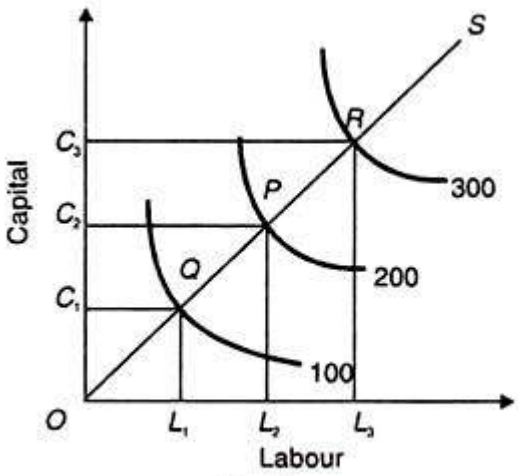


Fig. 20

3. The C-D production function is criticised because it shows constant returns to scale. But constant returns to scale are not an actuality, for either increasing or decreasing returns to scale are applicable to production.

It is not possible to change all inputs to bring a proportionate change in the outputs of all the industries. Some inputs are scarce and cannot be increased in the same proportion as abundant inputs. On the other hand, inputs like machines, entrepreneurship, etc. are indivisible. As output increases due to the use of indivisible factors to their maximum capacity, per unit cost falls.

Thus when the supply of inputs is scarce and indivisibilities are present, constant returns to scale are not possible. Whenever the units of different inputs are increased in the production process, economies of scale and specialization lead to increasing returns to scale.

In practice, however, no entrepreneur will like to increase the various units of inputs in order to have a proportionate increase in output. His endeavour is to have more than proportionate increase in output, though diminishing returns to scale are also not ruled out.

4. The C-D production function is based on the assumption of substitutability of factors and neglects the complementarity of factors.

5. This function is based on the assumption of perfect competition in the factor market which is unrealistic. If, however, this assumption is dropped, the coefficients α and β do not represent factor shares.

6. One of the weaknesses of C-D function is the aggregation problem. This problem arises when this function is applied to every firm in an industry and to the entire industry. In this situation, there will be many production functions of low or high aggregation. Thus the C-D function does not measure what it aims at measuring.

Conclusion:

Thus the practicability of the C-D production function in the manufacturing industry is a doubtful proposition. This is not applicable to agriculture where for intensive cultivation, increasing the quantities of inputs will not raise output proportionately. Even then, it cannot be denied that constant returns to scale are a stage in the life of a firm, industry or economy. It is another thing that this stage may come after some time and for a short while.

It's Importance:

Despite these criticisms, the C-D function is of much importance.

1. It has been used widely in empirical studies of manufacturing industries and in inter-industry comparisons.

2. It is used to determine the relative shares of labour and capital in total output.

3. It is used to prove Euler's Theorem.

4. Its parameters a and b represent elasticity coefficients that are used for inter-sectoral comparisons.

5. This production function is linear homogeneous of degree one which shows constant returns to scale, If $\alpha + \beta = 1$, there are increasing returns to scale and if $\alpha + \beta < 1$, there are diminishing returns to scale.

6. Economists have extended this production function to more than two variables.

IMPORTANT QUESTIONS

1. Briefly explain the production function and influencing factors.
2. Define production function and what their limitations are.
3. What is the meaning of production function and their following factors?
4. Cobb-douglas production function?