AAGMAN GOKHALE

INTRODUCTION TO MANAGERIAL ECONOMICS

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INTRODUCTION TO MANAGERIAL ECONOMICS AND DEMAND ANALYSIS

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1.1 Definition of Managerial Economics - Scope of Managerial Economics and its relationship with other subjects

"Managerial Economics is economics applied in decision making. It is a special branch of economics bridging the gap between abstract theory and managerial practice".

– Haynes, Mote and Paul.

"Business Economics consists of the use of economic modes of thought to analyze business situations".

- McNair and Meriam.

"Business 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 and Seegelman.

"Managerial economics is concerned with application of economic concepts and economic analysis to the problems of formulating rational managerial decision".

- Mansfield.

1.1.1 Scope of Managerial Economics and its relationship with other subjects

The extent of managerial economics aspects is not yet plainly laid out on the grounds that it is a creating science. Even then the following fields may be said to generally fall under Managerial Economics.

1. Demand Analysis and Forecasting.

2. Cost and Production Analysis.

3. Pricing Decisions, Policies and Practices.

4. Profit Management.

5. Capital Management.

These divisions of business economics constitute its subject matter. Earlier managerial economists have started making increased use of operation research methods like linear programming, games theory, inventory models, queuing up theory etc, have also been regarded as a part of managerial economics.

1. Demand Analysis and Forecasting

A business firm is an economic organization which is engaged in transforming productive resources into goods that are to be sold in the market. A important part of managerial decision making depends on exact estimates of demand.

A forecast of future sales serves as a guide to management for preparing production schedules and employing resources. This will support management to maintain or strengthen its market position and profit base. Demand analysis also identifies a number of other factors influencing the demand for a product. Demand analysis and forecasting occupies a strategic place in managerial economics.

2. Cost and production analysis

A firm profitability depends much on its cost of production. The wise manager would prepare cost estimates of a range of output, identify the factors causing variations in cost estimates and choose the cost-minimizing output level, taking also into consideration the degree of uncertainty in production and cost calculations.

The process of production are under the charge of architects however the business chief should complete the creation, work examination keeping in mind the end goal to maintain a strategic distance from wastages of materials and time. Sound pricing practices depend much on cost control.

3. Pricing decisions, policies and practices

Pricing is a major area of managerial economics. In fact price is the genesis of the revenue of a firm and as such the success of a business firm largely depends on the correctness of the price decisions taken by it.

The important aspects dealt with this area are price determination in different market forms, differential pricing, pricing methods, product-line pricing and price forecasting.

4. Profit management

Business firms are commonly organized for earning profit and in the long period it is profit which gives the chief measure of success of a firm. Economics tells us that profits are the reward for uncertainty bearing and risk taking. The successful business manager is one who can form more or less correct estimates of costs and revenues likely to accrue to the firm at different levels of output.

The more successful a manager is in reducing uncertainty the higher are the profits earned by him. In fact profit planning and profit measurement constitute the most challenging area of managerial economics.

5. Capital management

The problems relating to firm capital investments are perhaps the most complex and troublesome. Capital management implies planning and control of capital expenditure because it involves a large sum and moreover the problems in disposing the capital assets off are so complex that they needs considerable time and labour. A fundamental point managed under capital administration are cost of capital, rate of return and determination of ventures.

Managerial Economics and its relation with other subjects

Managerial economics is generally defined as economics applied in decision making. In this connection we can create a distinction between the concepts of economic decision and technical decision.

Economic decision refers to the following,

(i) The decision taken by any producer regarding the volume of output to be produced during any particular time period to maximize its profit. The producer either needs to maximize its output given its cost constraint or minimize the cost given the targeted output.

(ii) The decision taken by any consumer regarding the quantities of commodities to be purchased to maximize his/her utility (The want satisfying power of a commodity is considered as its utility). The consumer needs to maximize his/her utility subject to his/her budget constraint.

(iii) The decision taken by the government to invest in such activities which maximize social welfare.

In other side the technical decision refers to the following points,

(i) (ii) The decision taken by any architecture regarding the technicalities of a design plan say for building a housing complex.

(iii) The decision taken by any entrepreneur (even a farmer) with regard to the proportion in which some inputs are to be applied in any production process without any consideration for the prices of those inputs (say the proportion of water and chemical fertilizer to be applied in any cultivation work) etc.

If any building firm plans a warm power venture, the specialized choice of the firm ends up. However if the same firm creates a cost benefit analysis with an objective to maximize its profit or minimize its cost the economic decision becomes relevant.

Similarly when a farmer chooses a particular proportion of high yielding varieties of seeds, chemical fertilizers and irrigation water for carrying out the cultivation process the technical decision becomes relevant.

But the market prices of those inputs and the given income of the poor farmer may not allow him to achieve that technical decision. Hence when we take into account the given input prices and the available fund to be invested in the production process, the economic decision becomes more relevant.

Table: Basic Differences between Economic and Technical Decisions

Economic decision	Technical decision
1. It is more concerned with the theoretical aspect of a production or consumption decision.	1. It is more worried about the specialized or application parts of any beneficial action.
2. It is concerned with Optimization behaviour of	2. It is concerned with achieving a targeted output with technologically efficient dose of

a firm subject to cost or fund constraint.	inputs (disregarding the input prices).

Fundamental concept of managerial economics

Economic theories concepts and analytical tools are support to a businessman in arriving at better decisions in actual business life. The following economic concepts are fundamental to business analysis and decision making.

1. Opportunity cost principle

2. Incremental cost and revenue principle

3. Time perspective

4. Equi-marginal principle

1. Opportunity Cost

Decisions imply making a choice from the various alternatives. The opportunity cost of a decision is the sacrifice of the next best alternative course of action available. A decision is cost free if it involves no sacrifice. This can be best understood with the help of a few illustrations.

The opportunity cost of the time an entrepreneur devotes to his own business is the salary he could earn by seeking employment elsewhere.

The opportunity cost of the funds employed in one's own business is the interest that could be earned on those funds had they been employed in other ventures.

The opportunity cost of holding Rs. 500 as cash in hand for one year is the 10% rate of interest which would have been earned had the money been kept as fixed deposit in a bank.

The opportunity cost of using a machine to produce one product is the earnings foregone which would have been possible from other products.

Thus, it should be clear that opportunity costs require ascertainment of sacrifices, if a decision involves no sacrifices the opportunity cost is nil. For decision making, opportunity costs are the only relevant costs.

2. Incremental cost and revenue principle

Incremental concept is related to the marginal costs and marginal revenues. It includes assessing the effect of choice and choices on expenses and incomes, underscoring the adjustments in absolute cost and aggregate income coming about because of changes in costs items, techniques, speculations or whatever may be in question in the choice.

The two basic components of incremental reasoning are incremental cost and incremental revenue. Incremental cost might be defined as the change in total cost resulting from a particular decision. Incremental revenue is the change in total revenue resulting from a particular decision.

For example: If a firm decides to go for computerization of market information, the additional revenue it earns will be termed incremental revenue and the extra cost of setting up computer facilities will be termed incremental cost.

Thus, when the incremental revenue exceeds incremental cost resulting from a particular decision it is regarded profitable. This certainly supports in arriving at a better decision by comparing incremental costs and revenues of alternative decisions.

3. Time perspective

In the field of pricing, time has a crucial role to play. The credit goes to Marshall for taking cognizance of time element in the theory of value. He studied the market on the basis of time namely very short period, short period, long period etc.

In managerial economics the analysis and decisions are classified into short and long period. That is why short and long run time periods are widely known and popularly used in managerial economics.

Marginal economists are concerned with short run and long run effects of decisions on revenues and costs. The crucial problem in decision making is to maintain the right balance between the short and long run business perspectives. In other words the managerial should take a long range view of effects on costs and revenues rather than merely a short sighted view.

A decision may be made on the basis of short run considerations but as time passes have long run repercussions that create it more or less profitable than at first seemed. In the ultimate analysis, a proper balance between the short term considerations and long term implications is influenced by the sensitivity of the customers.

4. The equi marginal principle

An important proposition of economics is that an input should be allocated in such a way that the value added by the last unit is the same in all uses. This proposition is popularly known as the equi-marginal principle.

Let us consider a case in which the firm is involved in four activities viz activity A, activity B, activity C, activity D. All these activities require the services of labour. The firm can increase any one of the activities by employing more labour but only at the cost of other activities.

In this case the firm allocates labour for each of the activity in such a manner that the value of the marginal product is equal in all activities.

$VMP_{LA} = VMP_{LB} = VMP_{LC} = VMP_{LD}$

Where L indicates labour and A, B, C, D, represent the activities, that is, the value of the marginal product of labour employed in A is equal to the value of the marginal product of the labour employed in B and so on.

If the firm finds that the value of the marginal product is greater in one activity than another, the firm must realize the fact that an optimum has not been achieved.

Importance/ usefulness of managerial economics

Managerial Economics is the use of economic and logic principles to aid management decision making. Managers are decision makers and economics have to be relevant to provide practical guidance in arriving at right decisions.

Every manager has to take important decisions about using his limited resources like land, capital, finance, labour etc. to get the maximum returns therefore managerial economics concentrates on those practical aspects of microeconomics which help in decision making.

Managerial economics focuses on the most profitable use of scarce resources rather than on the achievement of equilibrium prices and quantities as pure theory of economics does. Hence, it is more practical and pragmatic than micro economics. Managerial economics equipped with theoretical background gives an answer to practical problems faced by a business firm.

Managerial economics has introduced dynamism in the world of decision making and business environment. In a free market economy, success in business depends upon how quickly business anticipates and responds to the changing nature of the market place.

Business managers forever face a need to adapt to changes in the business environment. The business world has to be dynamic to face the changing trends in demand. This dynamism pervades decision making and necessitates the integration of managerial economics into the business environment.

Managerial economics has given rise to the emergence of a new approach in decision making known as corporate strategy. Business Corporation work with a given set of corporate goals and objectives against the background of a set of assumptions about the company's economic, competitive, factor supply, regulatory, technological and international environment. Strategic planning is a three fold problem viz a portfolio problem, an investment problem and a strategy selection problem.

The portfolio problem pertains to which business should the company adopt. The investment problem pertains to the level of investment to be created by each business. The strategy selection problem pertains to the specific financial, marketing and production strategies to be followed by each business firm. Thus the integration of managerial economics in decision making has given rise to corporate economics.

Managerial economics sharpens the business acumen. An ability to analyze problems logically and clearly supports to take good decisions. Managerial economics provides necessary tools to the management in its decision making process.

Managerial economics has emerged as a special branch of knowledge allied to economics to enrich the decision makers at various levels of firm's operations. Concepts in the area of demand, costs, sales etc help to apply theories to the solution of problems in day to day business activity. Managerial economics with the knowledge of operations research provides the professional managers with the required tools and models to solve problems in a more scientific way.

Relationship of managerial economics with other disciplines

Managerial economics is closely related to other subjects like micro economic theory, macro economic theory, mathematics, statistics, accounting and operations research. Managerial economics is using the logic of economics, mathematics and statistics to provide effective ways of thinking about business decision problems.

Managerial economics and micro economics

Managerial economics is mainly micro economic in character making use of several of the concepts and tools provided by micro economic theory. The concept of elasticity of demand, marginal cost, market structures, the theory of the firm and the theory of pricing of micro economics make use of managerial economics.

Hence, the study of micro economics is necessary for the better understanding of managerial economics. All micro economic theories which can be applied in business are made use of in managerial economics.

Managerial economics and Macro economics

Macro economics is concerned with aggregates and Macro economics concepts are used in managerial economics in the area of forecasting general business conditions. The theory of the firm pricing policies etc., have to be viewed in the broad frame work of the economic system and it is essential that the business executives should have some knowledge of the whole economic system.

Macro economic concepts like national income, business cycles, social accounting, managerial efficiency of capital, multiplier, fiscal policies etc have to be studied in managerial economics for forecasting the business conditions.

Both micro and macro economics are closely related to managerial economics. Managerial economics is derived from micro and macro economics so that it can apply these principles to solve the day to day problems faced by businessmen.

Managerial economics and Mathematics

Managerial economics is becoming increasingly mathematical in character. Businessmen deal with different concepts which are measurable. The use of mathematical logic gives clarity of concepts. Likewise it gives a deliberate structure inside which quantitative relationship may broke down. Mathematics therefore is of great help to managerial economics.

The major problem confronting businessmen is to minimize cost or maximize profit or optimize sales. To find out the solution for the overall problems, mathematical concepts and techniques are widely used. Mathematical techniques like linear programming, games theory etc help managerial economists to solve many of their problems.

Managerial economics and statistics

Statistics is a science concerned with collection, classification, tabulation and analysis of data for some specified purpose. Managerial economics and statistics are closely related as businessmen deal mainly with concepts that are quantifiable.

For example: demand, price, cost of operation etc.

Statistics is useful to managerial economics in many ways

a. Managerial economics requires marshalling of quantitative data to find out functional relationship involved in decision making. This is done with the help of statistics.

b. Statistical methods are used for empirical testing in managerial economics.

c. The business executives have to work and take decisions in an uncertainty framework. The theory of probability evolved by statistics helps managerial economists for taking a logical decision.

Thus statistical methods gives sound base for decision making and help the businessmen to achieve the objective without much difficulty. Statistical tools are extensively used in the solution of managerial problems.

Managerial economists make use of different statistical techniques like the theory of probability, regression analysis, corelation techniques etc. in various business situations.

Managerial economics and Operations research

Operations research is the application of mathematical techniques in solving business problems. It deals with model building that is construction of theoretical models that help the decision making process.

Though the roots of operations research lie in military studies it is now largely used in business administration, planning and control. Linear programming and allied concepts of operations research are used in managerial economics.

Managerial economics and Accounting

Accounting is concerned with recording the financial operations of a business firm. Accounting information is one of the primary sources of data required for managerial economists for the decision making purpose. The information it contains can be used by the managerial economist to throw some light on the future course of action.

1.2 Concept of Demand, Types of Demand, Determinants of Demand- Demand schedule, Demand curve - Law of Demand and its limitations

The aspiration for a commodity of an individual or a group will be called their demand when they are able to pay for that commodity. That is demand is desire with account to pay.

In Benham's words "Demand for anything at a given price is the amount of it which will be bought per unit of time at that price".

Another definition of demand is "By demand, we mean the various quantities of a given commodity or service which the consumers would buy in a market in a given period of time at various prices or at various incomes or at various prices of related goods".

Demand Schedule

The demand schedule represents the relationship between price and quantity demanded as shown in below figure. The demand schedule generally has 2 columns. One for the price of a product and one for the quantity demanded at that price.

The price column displays different price levels arrayed from lowest to highest or vice versa while the quantity demanded column displays the quantity of that good or service demanded at each price level. The schedule for demand for most items will demonstrate a diminishment in amount requested as the cost increments.

Demand schedule can be categorized into two types which are shown in the below figure.

Types of Demand schedules

The two types of demand schedules are explained as follows,

Individual demand schedule

It refers to a tabular representation of quantity of products demanded by an individual at different prices and time.

Below table represents the individual demand schedule of product:

Table 1: Individual Demand Schedule	
Price of A (per kg in Rs.)	**Quantity Demanded (per week in kgs)**
10	15
15	10
20	8
25	4
30	2

Following are the characteristics of individual demand schedule:

a. Demonstrates the effect of changing price on the buying behavior of customers rather than change in the demand for a product.

b. Describes the disparity in demand with the difference in the product price.

c. Represents that at higher prices, the quantity demanded reduces and vice versa.

Market demand schedule

This schedule shows a tabular representation of quantity demanded in aggregate by individuals at different prices and time. Therefore, it demonstrates the demand of a product in the market at different prices. The market demand schedule can be derived by aggregating the individual demand schedules.

Below table represents the market demand schedule prepared through the individual demand schedule of three individuals.

Table 2: Market Demand Schedule				
Price of A (per unit in Rs.)	**Individual Demand(per day)**			**Market Demand (per day)**
	X	**Y**	**Z**	
4	1	3	4	8
3	3	4	5	12
2	4	5	6	15
1	5	9	9	23

Market demand schedule also demonstrates an inverse relation between the quantity demanded and price of a product.

Demand Curve

The demand curve is a visual form of the demand schedule. Economists depict the demand schedule on a two dimensional graph consisting of a vertical axis representing price and a horizontal axis representing quantity demanded. The vertical axis displays different price levels from highest to lowest while the horizontal axis displays various levels of demand.

The apex of the vertical and horizontal axis has a value of zero for both quantity and price. Mankiw notes that the demand curve for most products slopes downward indicating an increase in demand as the price declines.

Demand curve

1.2.1 Law of Demand and its limitations

A microeconomic law states that all other factors being equal as the price of a good or service increases, consumer demand for the good or service will decrease and vice versa. The law of demand says that the higher the price, the lower the quantity demanded because consumer's opportunity cost to acquire that good or service increases and they should make more trade offs to acquire the more expensive product.

Assumptions

1. Tastes and preferences of the consumer remain constant.

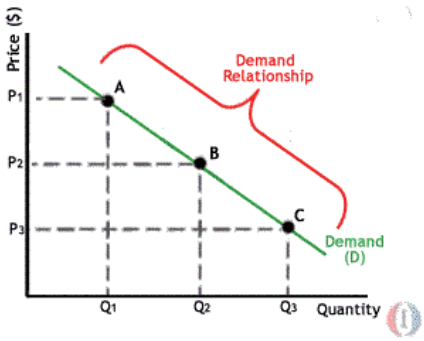
2. No change in the income of the consumer.

3. Prices of related goods do not change.

4. Consumers do not expect any change in the price of the commodity in the near future.

Breaking Down 'Law of Demand'

The chart below explains the law of demand using a demand curve which is always downward sloping. Each point on the curve (A, B, C) reflects a direct correlation between quantity demanded (Q) and price (P). So at point A, the quantity demanded will be Q1 and the price will be P1 and so on.



The law of demand is so intuitive that we might not even be aware of all the examples around us.

When shirts go on sale, we may buy 3 instead of one. The quantity that we demand increases because the price has fallen.

When plane tickets become more expensive we are less likely to travel by air and more likely to choose the less expensive options of driving or staying home itself. The amount of plane tickets that we demand decreases to zero because the cost has gone up.

The law of demand summarizes the effect, price changes have on consumer behavior. For example: A consumer will purchase more pizzas if the price of pizza falls. The opposite is true if the price of pizza increases. John may demand 10 pizzas if they cost Rs 20 each but only 7 pizzas if the price rises to Rs. 22 and only 4 pizzas if the price rises to Rs 40.

The law of demand is one of the most fundamental concepts in economics. It works with the law of supply to explain how market economies allocate resources and calculate the prices of goods and services.

1.3 Elasticity of Demand- Types of Elasticity of Demand and Measurement - Demand forecasting and Methods of forecasting - Concept of Supply and Law of Supply

Elasticity of Demand represents the degree of responsiveness of quantity demanded to the changes in the determinants of demand. There are mainly three quantifiable determinants of demand.

1. Price of the good.

2. Income of the consumer.

3. Price of the related goods.

Types of Elasticity Of Demand

Elasticity of demand can be of three types,

1. Price Elasticity of Demand

2. Income Elasticity of Demand

3. Cross Elasticity of Demand

Price elasticity of demand

Concept of elasticity of demand: Alfred Marshall introduced the concept of elasticity in 1890 to measure the magnitude of percentage change in the quantity demanded of a commodity to a certain percentage change in its price or the income of the buyer or in the prices of related goods.

Here, we look at the sensitivity of demand for a product to a change in the product's own price. Since price elasticity of demand is predominantly used in economic analysis, it is alternatively referred to as elasticity of demand.

Definition

Value versatility of interest is the level of responsiveness of interest to an adjustment in its cost. In technical terms, it is the ratio of the percentage change in demand to the percentage change in price. Thus,E_p = Percentage change in quantity demanded/Percentage change in price.In mathematical terms, it can be represented as,

$Ep = (\Delta q/\Delta p)\ (p/q)$.

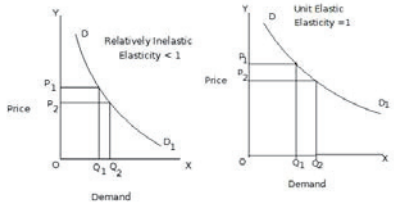
From the definition it follows that,

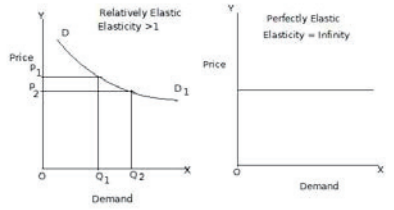
• When percentage change in quantity demanded is less than the percentage change in price then price elasticity will be less than one and in this case demand is said to be inelastic.

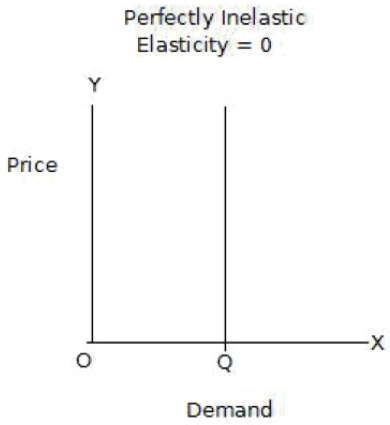
• When percentage change in quantity demanded is equal to the percentage change in price then price elasticity will be equal to one and in this case demand is said to be unit elastic.

• When percentage change in quantity demanded is greater than the percentage change in price then price elasticity will be greater than one and in this case demand is said to be elastic.

Diagrammatic representation of price elasticity of demand







Cross elasticity of demand

It is a measure of the degree to which the interest for a decent changes when the cost of a substitute or supplement changes different things continuing as same.

1. The formula used to calculate the cross elasticity of demand is

Cross elasticity of demand = Percentage change in quantity demanded of a good / Percentage change in price of one of its substitute s or complement s.

2. The cross elasticity of demand for a substitute is positive.

3. The cross elasticity of demand for a complement is negative.

Income elasticity of demand

The income elasticity of demand is a measure of the extent to which the demand for a good changes when income changes, other things remaining the same.

The formula used to determine the income elasticity of demand is,

Income elasticity of demand = Percentage change in quantity demanded / Percentage change in income

For a normal good the income elasticity of demand is positive.

When the income elasticity of demand is greater than 1 demand is income elastic.

When the income elasticity of demand is between zero and 1 demand is income inelastic.

For an inferior good the income elasticity of demand is less than 0.

Methods of measuring price elasticity of demand

There are four methods of measuring elasticity of demand. They are the percentage method, point method, arc method and expenditure method.

(a) Percentage method

The price elasticity of demand is measured by its coefficient (Ep). This coefficient (Ep) measures the percentage change in the quantity of a commodity demanded resulting from a given percentage change in its price. Thus

$$E_p = \frac{\%\ change\ in\ q}{\%\ change\ in\ p} = \frac{\Delta q / q}{\Delta p / p} = \frac{\Delta q}{\Delta p} \times \frac{p}{q}$$

where,

q - quantity demanded

p - price and

A - change.

If $E_p > 1$ demand is elastic.

If $E_p < 1$ demand is inelastic and if $E_p = 1$ demand is unitary elastic.

With this formula we can compute price elasticities of demand on the basis of a demand schedule.

Demand Schedule

Combination	Price (Rs.) Per Kg. of X	Quantity Kgs. of X
A	6	0
B	5	10
C	4	20
D	3	30
E	2	40
F	1	50
G	0	60

Let us first take combinations B and D.

(i) Suppose, the price of commodity X falls from Rs.5 per kg to Rs.3 per kg and its quantity demanded increases from 10 kg to 30 kg.

Then,

$$E_p = \frac{\Delta q}{\Delta p} \times \frac{p}{q} = \frac{(30-10)}{(3-5)} \times \frac{5}{10} = \frac{20}{-2} \times \frac{5}{10} = -5 \text{ or } > 1.$$

This shows elastic demand or elasticity of demand is greater than unitary.

Note:

The formula can be understood like this,

$\Delta q = q_2 - q_1$

where q_2 is the new quantity (30 kg) and q_2 the original quantity (10 kg).

$\Delta P = p_2 - p_1$

where,

p_2 is the new price (Rs.3) and p the original price (Rs. 5).

In the formula, p refers to the original price (p_1) and q to original quantity (q_1). The opposite is the case in example (ii) below where Rs.3 becomes the original price and 30 kg as the original quantity.

(ii) Let us measure elasticity by moving in the reverse direction. Suppose, the price of X rises from Rs. 3 per kg to Rs. 5 per kg and the quantity demanded decreases from 30 kg to 10 kg.

Then,

$$E_p = \frac{\Delta q}{\Delta p} \times \frac{p}{q} = \frac{(10-30)}{(5-3)} \times \frac{3}{30} = \frac{-20}{2} \times \frac{3}{30} = -1$$

This shows unitary elasticity of demand. Notice that the value of E_p in example (i) Differs from that in example (ii) depending on the direction in which we move. This difference in the elasticities is due to the use of a different base in computing percentage changes in each case. Now, consider combinations D and F.

(iii) Suppose, the price of commodity X falls from Rs. 3 per kg to Re. 1 per kg and its quantity demanded increases from 30 kg to 50 kg.

Then,

$$E_p = \frac{\Delta q}{\Delta p} \times \frac{p}{q} = \frac{(50-30)}{(1-3)} \times \frac{3}{30} = \frac{20}{2} \times \frac{3}{30} = -1$$

This is again unitary elasticity.

(iv) Take the reverse order when the price rises from Re. 1 per kg to Rs. 3 per kg and the quantity demanded decreases from 50 kg to 30 kg.

Then,

$$E_p = \frac{\Delta q}{\Delta p} \times \frac{p}{q} = \frac{(30-50)}{3-1} \times \frac{1}{50} = \frac{-20}{2} \times \frac{1}{50} = -\frac{1}{5} < 1$$

This shows inelastic demand or less than unitary.

The value of E_p again differs in this example than that given in example (iii) for the reason stated above.

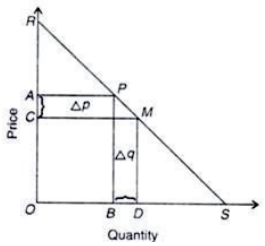
(b) Point method

Professor Marshall devised a geometrical method for measuring elasticity at a point on the demand curve. Let RS be a straight line demand curve in figure. If the price falls from PB (= OA) to MD (= OC), the quantity demanded increases from OB to OD.

Elasticity at point P on the RS demand curve according to the formula is,

$E_P = \Delta q/\Delta p \times p/q$

where Δq represents change in quantity demanded, Δp changes in price level while p and q are initial price and quantity levels.



From the above figure,

Δq = BD = QM

Δp = PQ

P = PB

q = OB

Substituting these values in the elasticity formula.

E_P = QM/PQ× PB/OB

Moreover,

QM/PQ × BS/PB

[<PQM = <PBS are similar Δs]

BS/PB× PB/OB = BS/OB

Since Δ PBS and ΔROS are similar.

Ep at point p = BS/OB = OA/AR = PS/PR = Lower Segment/Upper Segment.

With the help of the point method, it is easy to point out elasticity at any point along a demand curve. Suppose that the straight line demand curve DC in below figure is 6 centimeters. Five points L, M, N, P and Q are taken on this demand curve.

The elasticity of demand at each point can be known by the above method. Let point N be in the middle of the demand curve. So, elasticity of demand at point is given by,

N = CN (Lower Segment) / ND (Upper Segment) = 3/3 = 1 (Unity).

Elasticity of demand at point M is given as,

M = CM/MD = 5/1 = 5 or > 1. (Greater than Unity)

Elasticity of demand at point L is given below as,

L = CL/LD = 6/0 = ∞ (infinity).

Elasticity of demand at point P,

P = CP/PD = 1/5 = (Less than Unity).

Elasticity of demand at point Q is given by,

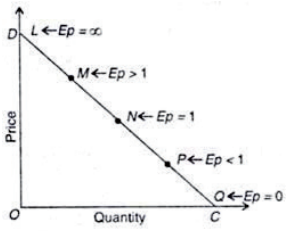
Q = CQ/QD = 0/6 = 0(Zero).

We arrive at the conclusion that at the midpoint on the demand curve the elasticity of demand is unity. Moving up the demand curve from the midpoint, elasticity becomes greater. When the demand curve touches the Y axis, elasticity is infinity. Factor at any point below the midpoint towards the X axis will show elastic demand. Elasticity becomes zero when the demand curve touches the X axis.

(c) Arc method

We have studied the measurement of elasticity at a point on a demand curve. But when elasticity is measured between two points on the same demand curve it is known as arc elasticity.

In the words of Prof. Baumol “Arc elasticity is a measure of the average responsiveness to price change exhibited by a demand curve over some finite stretch of the curve”.



Any two points on a demand curve make an arc. The area between P and M on the DD curve in figure is an arc which measures elasticity over a certain range of price and quantities. On any two points of a demand curve the elasticity coefficients are likely to be different depending upon the method of computation. Consider the price quantity combinations P and M as given in below table.

1.3.1 Demand schedule

Point	Price (Rs)	Quantity (Kg)
P	8	10
M	6	12

If we move from P to M, the elasticity of demand is,

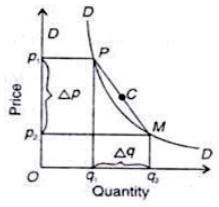
EP = ΔQ/ΔP × p/q = (12 – 10) / (6-8) × 8/10 = 2/-2 × 8/10 = 4/5

If we move in the reverse direction from M to P,

Then,

(10-20) / (6-8) × 6/12 = -2/2 × 6/12 = -1/2.

Thus, the point method of measuring elasticity at 2 points on a demand curve gives different elasticity coefficients because we used a different base in computing the percentage change in each case.



Demand schedule curve

To avoid this discrepancy elasticity for the arc (PM in the above figure) is determined by taking the average of the two prices [$(p_1 + p_2)1/2$] and the average of the two quantities [$(q_1 + q_2)1/2$]. The formula for price elasticity of demand at the midpoint (C in above figure) of the arc on the demand curve is,

$$E_p = \frac{\frac{\Delta q}{(q_1+q_2)^{1/2}}}{\frac{\Delta p}{(p_1+p_2)^{1/2}}} = \frac{\Delta q}{(q_1+q_2)^{1/2}} \times \frac{(p_1+p_2)^{1/2}}{\Delta p} = \frac{\Delta q}{\Delta p} \times \frac{p_1+p_2}{q_1+q_2}$$

On the basis of this formula we can measure arc elasticity of demand when there is a movement either from point P to M or from M to P.

From P to M at point P,

$p_1 = 8$, $q_1 = 10$ and at point M, $p_2 = 6$, $q_2 = 12$.

Applying these values we get,

$E_P = \Delta q/\Delta p \times p_1 + p_2 / q_1 + q_2 = (12\text{-}10) / 8\text{-}6 \times (8 + 6) \times (10+12) = 2/\text{-}2 \times 14/22 = \text{-}7/11$.

From M to P at point M, $P_1 = 6$, $q_1 = 12$ and at point, $p_2 = 8$, $q_2 = 10$.

Now, we have $E_P = (10\text{-}12) / (8\text{-}6) \times (6+8)/12+10) = \text{-}2/2 \times 14/22 = \text{-}7/11$.

Thus, whether we move from M to P or P to M on the arc PM of the DD curve the formula for arc elasticity of demand gives the same numerical value. The closer the 2 points P and M are the more accurate is the measure of elasticity on the basis of this formula.

If the two points which form the arc on the demand curve are so close that they almost merge into each other the numerical value of arc elasticity equals the numerical value of point elasticity.

(d) Total outlay method

Marshall evolved the total outlay or total revenue or total expenditure method as a measure of elasticity. By comparing the total expenditure of a purchaser both before and after the change in price, it can be known whether his demand for a good is elastic, unity or less elastic.

Total outlay is price multiplied by the quantity of a good purchased.

Total Outlay = Price x Quantity Demanded.

This is explained with the help of the demand schedule in below table.

Table. 3 : Total Outlay Method

Price Rs. per Kg.	*Quantity in Kgs.*	*TE in Rs*	*Ep*
(1)	(2)	(1×2)=3	(4)
9	2	18	
8	3	24	> 1
7	4	28	
6	5	30	
5	6	30	= 1
4	7.5	30	
3	8	24	
2	9	18	< 1
1	10	10	

Price Rs. Per Kg.	Quantity in Kgs.q	TE in Rs.	E_p
(1)	(2)	(1x2) = 3	(4)
9	2	18	>1
8	3	24	
7	4	28	
6	5	30	=1
5	6	30	
4	7.5	30	
3	8	24	<1
2	9	18	
1	10	10	

(i) Elastic demand

Demand is elastic when with the fall in price, the total expenditure increases and with the rise in

price the total expenditure decreases. The above table shows that when the price falls from Rs. 10 to Rs. 9 the total expenditure increases from Rs. 19 to Rs. 25 and when price rises from Rs. 8 to Rs. 9 the total expenditure falls from Rs. 29 to Rs. 23. Demand is elastic (Ep > 1) in this case.

(ii) Unitary elastic demand

When with the fall or rise in price the total expenditure remains unchanged the elasticity of demand is unity. This is shown in the above table when with the fall in price from Rs. 6 to Rs. 5 or

with the rise in price from Rs. 4 to Rs. 5, the total expenditure remains unchanged at Rs. 30, i.e., Ep = 1.

(iii) Less elastic demand

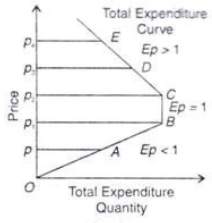
Demand is less elastic if with the fall in price, the total expenditure falls and with the rise in price the total expenditure rises. In above table when the price falls from Rs. 3 to Rs. 2 total expenditure falls from Rs. 24 to Rs 18 and when the price rises from Re. 1 to Rs. 2 the total expenditure also rises from Rs. 10 to Rs. 18. This is the case of inelastic or less elastic demand Ep < 1.

The below table summarizes the relationships,

Total outlay method

Price	*TE*	*Ep*
Falls	Rises }	>1
Rises	Falls }	
Falls	Unchanged }	=1
Rises	Unchanged }	
Falls	Falls }	
Rises	Rises }	<1

The measurement of elasticity of demand in terms of the total outlay method is explained in above figure where we divide the relationship between price elasticity of demand and total expenditure into three stages.



Total outlay curve

In the first stage, when the price falls from OP_4 to OP_3 and to OP_2 respectively the total expenditure rises from P_4E to P_3D and P_2C respectively. On the other hand, when the price increases from OP_2 to OP_3 and OP_4 the total expenditure decreases from P_2C to P_3D and P_4E respectively.

Thus, EC (Expenditure Curve) segment of total expenditure curve shows elastic demand ($E_p > 1$).

In the second stage, when the price falls from OP_2 to OP_1 or rises from OP_1 to OP_2, the total expenditure equals $P_2 C = P_1B$ and the elasticity of demand is equal to the unity ($E_p = 1$).

In the third stage, when the price falls from Op_1 to Op_2, the total expenditure also falls from P_1 B to PA. Thus, with the rise in price from OP to Op_1, the total expenditure also increases from PA to P_1B and the elasticity of demand is less than unity ($E_p < 1$).

Factors affecting price elasticity of demand

Elasticity of demand for any commodity is determined or influenced by a number of factors which are discussed as under.

(1) Nature of the commodity

The elasticity of demand for any commodity depends upon the category to which it belongs i.e., whether it is a necessity, comfort or luxury.

For example: The demand for necessities like food, salt, matches, etc. does not change much with rise or fall in their prices. Similar is the case with commodities which are needed at the time of marriage, death ceremonies, etc. The demand for necessities of efficiency and for comforts is moderately elastic because with the rise or fall in their prices, the demand for them decreases or increases moderately.

On the other hand, the demand for luxuries is more elastic because with a small change in their prices there is a large change in their demand. But the demand for prestige goods like jewels, rare stamps, rare coins, paintings by Tagore or Picasso etc., is inelastic because they possess unique utility for the buyers who are prepared to buy them at all costs.

(2) Substitutes

The commodities having substitutes have more flexible request in light of the fact that with the adjustment in the cost of one ware the interest for its substitute is instantly influenced.

For example: If the price of coffee rises the demand for coffee will decrease and that for tea will increase and vice versa. But the demand for commodities having no good substitutes is inelastic.

(3) Variety of uses

The demand for a commodity having composite demand or variety of uses is more elastic. Such commodities are coal, steel, milk, electricity etc.

For example: Coal is used for cooking and heating, for power generation in factories, in locomotives, etc. If there is a slight fall in the price of coal its demand will increase from all quarters.

On the other hand, a rise in its price will bring a considerable decrease in demand in less important uses and in more important uses efforts will also be made to economics its use as in railways and factories. Thus, the overall effect will be a reduction in demand. A commodity which cannot be put to more than one use has less elastic demand.

(4) Joint demand

There are certain commodities which are jointly demanded such as car and petrol, pen and ink,

bread and jam, etc. The elasticity of demand of the second commodity depends upon the elasticity of demand of the major commodity.

If the demand for cars is less elastic the demand for petrol will also be less elastic. On the other hand if the demand for say bread is elastic the demand for jam will also be elastic.

(5) Deferred consumption

Commodities whose consumption can be deferred have an elastic demand. This is the situation with sturdy shopper merchandise like bike, fabric, fan and so forth. If the price of any of these articles rises, people will postpone their consumption. As a result their demand will decrease and vice versa.

(6) Habits

If people are habituated to the consumption of a particular commodity like coffee, tea or cigarette of a particular brand ,the demand for it will be inelastic. We find that the prices of coffee, tea and cigarettes increase almost every year but there has been little effect on their demand because people are in the habit of consuming them.

(7) Income groups

The elasticity of demand also depends on the income group to which a person belongs. For persons who belong to the higher income group ,their demand for commodities is less elastic. It is immaterial to a rich man whether the price of a commodity has fallen or risen and hence, his demand for the commodity will be unaffected.

On the other hand, the demand of persons in lower income groups is generally elastic.

(8) Proportion of income spent

The consumer spends a small proportion of his income on a commodity at a time the demand for that commodity is less elastic because he does not bother much about small expenditure. Such commodities are shoe polish, pen, pencil, thread, needle, etc. But for commodities which entail a large proportion of the income of the consumer, the demand of them is elastic, such as bicycle, watch, etc.

(9) Level of prices

The level of prices also influences the elasticity of demand for commodities when the price level is high, the demand for commodities is elastic and when the price level is low and the demand is less elastic.

(10) Time factor

Time factor plays an important role in influencing the elasticity of demand for commodities. The shorter the time in which the consumer buys a commodity, the lesser will be the elasticity of

demand for that product. On the other hand the longer the time which the consumer takes in buying a commodity the higher will be the elasticity of demand for that product.

Professor Stigler mentions three possible reasons for the long period elasticity being higher than the short period elasticity. In the long run the consumer has a better knowledge of the price changes, takes time to readjust his budget and may change his consumption pattern due to possible technological changes.

(11) Brand

The price of demand for a given brand of product might be elastic. If its price increases people turn towards the other brands easily. For example: If the price of the Hero bicycle increases the consumer will buy the Atlas bicycle, this is known as substitution effect.

(12) Recurring demand

Goods which have recurring demand, their prices are more elastic than the goods which are not demanded time and again.

(13) Distribution of income

If a country has equal distribution of income and wealth the demand for majority of goods is elastic because there are more middle class people whose purchasing power is almost equal.

Significance of price elasticity of demand

Price elasticity of demand is useful in the following ways,

1. Useful for business

It allows the business in general and the monopolists in particular to fix the price.

Studying the nature of demand, the monopolist fixes higher prices for those goods which have inelastic demand and lower prices for goods which have elastic demand. In this way, this support him to maximize his profit.

2. Helpful to finance minister

It helps the Finance Minister to levy tax on goods. After levying taxes more and more on goods which have inelastic demand, the Government collects more revenue from the people without causing inconvenience to the people. Moreover, it is also useful for the planning.

3. Fixation of prices

It is very useful to fix the price of jointly supplied goods. In the case of joint products like paddy and straw, the cost of production of each is not known. The price of each is then fixed by its elastic and inelastic demand.

4. In the sphere of International trade

It is of greater significance in the sphere of international trade. It helps to determine the terms of trade and the consequent gain from foreign trade. If the demand for home product is inelastic, the terms of trade will be profitable to the home country.

5. Fixation of wages

It guides the producers to fix wages for laborers. They fix high or low wages according to the elastic or inelastic demand for the labour.

6. Effect on employment

The effect of machines on employment opportunities depends on elasticity of demand for the goods produced by such machines. In the first stage, use of such machines cause unemployment and prices will also fall. But when demand for such commodities is more elastic then fall in prices will generate more increase in its demand.

As a result, demand will stimulate greater production and hence more employment. If demand for commodities produced by these machines is inelastic then even fall in price will not increase demand as well as employment.

7. Paradox of poverty

It explains the paradox of poverty in the midst of plenty. A bumper crop instead of bringing prosperity may result in disaster if the demand for it is inelastic. This is specially when the products are perishable and not storable.

8. Incidence of taxation

Incidence of tax lies on the person who ultimately pays the tax. The rate is on the purchaser if request is superbly inelastic. He will go on buying as much as before despite the price rise. Thus, the government has to keep the watch on the ultimate burden of the tax which depends on the elasticity of demand of the commodity taxed. If necessaries which have less elastic demand are taxed, the burden will fall more on the poor sections of society. Therefore, principle of justice in taxation is based on elasticity of demand.

9. Significant for Government economic policies

The information of versatility of interest is essential for the administration in issues such as controlling of business cycles, evacuating inflationary and deflationary gaps in the economy. Similarly for price stabilization and the purchase and sale of stocks, information about elasticity of demand is most useful.

10. Changes in Rate of exchange

Rate of exchange between two currencies can be changed through devaluation or overvaluation of one currency in relation to other currencies. A country while deciding for such a course of action will take into consideration the elasticity of demand for its exports and imports.

If the government devalues the currency without considering the elasticity of demand for its exports and imports it might not be able to correct unfavorable balance of payments. Under these circumstances, the demand both for its exports and imports turns out to be inelastic.

11. Joint products

The idea of flexibility of interest assumes a vital part in deciding the cost of joint items. In case of joint products like skin and meat of goat, separate costs are not known. The manufacturer will be guided for the most part by request and its temperament while settling his cost. For instance, when goat is bought it is not kept in mind the separate costs of skin and meat.

When the seller sells the skin and meat, the seller keeps in mind the elasticity of demand of skin and meat. If elasticity of demand for meat is less elastic in that case the price of meat will be higher. On the other hand, if elasticity of demand for skin is more elastic, in that case the price of the skin will be low and vice versa.

12. Market forms

The concept of elasticity of demand is also useful in knowing the different market forms.

If cross elasticity of demand is infinite, in that case there is perfect competition in the market.

If cross elasticity is zero (or $E_c = 0$) it is a case of absolute or pure monopoly.

If cross elasticity of demand is less than one (or $E_c < 1$), in that case there is relative monopoly.

And if cross elasticity of demand is greater than one (or $E_c > 1$), in that case, there is monopolistic competition or imperfect competition.

13. International trade

The concept of elasticity of demand also plays a significant role in the international trade or the terms of trade. It is the nature of demand which is helpful in determining the amount of gain being enjoyed by different countries.

The terms of trade would be favorable in case of those countries whose exports are of the nature of more elastic demand. On the other hand the terms of trade would be unfavorable if the exports of a country are of the nature of less elastic demand.

14. Determination of price of public utilities

This concept is significant in the determination of the prices of public utility services. Economic welfare of the society largely depends upon the cheap availability of the essential products like

water, cooking gas, electricity, transportation etc. For such commodities, demand is inelastic and these should be controlled by the government.

The government will distribute these products at fair price. Therefore, government helps to fix the prices of necessities of life. In this way, versatility of interest is an imperative device of examination and it assumes a vital part in economic analysis.

Income elasticity of demand

A measure of the relationship between a change in the quantity demanded for a particular good and a change in real income. Income elasticity of demand is an economics term that refers to the sensitivity of the quantity demanded for a certain product in response to a change in consumer incomes. The formula for calculating income elasticity of demand is,

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

For example: If the quantity demanded for a good increases for 15% in response to a 10% increase in income. The income elasticity of demand would be 15%/10% = 1.5. The degree to which the quantity demanded for a good changes in response to a change in income depends on whether the good is a necessity or a luxury.

Cross elasticity of demand

An economic concept that measures the responsiveness in the quantity demand of one good when a change in price takes place in another good. The measure is calculated by taking the percentage change in the quantity demanded of one good divided by the percentage change in price of the substitute good.

$$E_C = \frac{P_1^A + P_2^A}{Q_1^B + Q_2^B} \times \frac{\Delta Q^B}{\Delta P^A}$$

Where:

P_1^A = The price of good A at time period 1

P_2^A = The price of good A at time period 2

Q_1^B = The quantity demanded of good B at time period 1

Q_2^B = The quantity demanded of good B at time period 2

ΔQ^B = The change in the quantity demanded of good B

ΔP^A = The change in price of good A

Types of elasticity

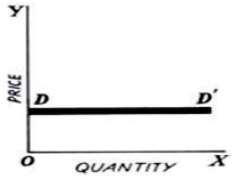
Distinction might be made between Price Elasticity, Income Elasticity and Cross Elasticity. Price Elasticity is the responsiveness of demand to change in price. Income elasticity means a change in demand in response to a change in the consumer's income and cross elasticity means a change in the demand for a commodity owing to change in the price of another commodity.

Degrees of elasticity of demand

We have seen above that some commodities have very elastic demand while others have less elastic demand. Let us now try to understand the different degrees of elasticity of demand with the help of curves.

(a) Infinite or Perfect elasticity of demand

Let us first take one extreme case of elasticity of demand viz., when it is infinite or perfect. Elasticity of demand is infinity when even a negligible fall in the price of the commodity leads to an infinite extension in the demand for it. The horizontal straight line DD' shows infinite elasticity of demand. Even when the price remains the same, the demand goes on changing as shown in below figure.



Infinite Elasticity

(b) Perfectly inelastic demand

The another extreme limit is when demand is perfectly inelastic. It means that howsoever great the rise or fall in the price of the commodity in question its demand remains absolutely unchanged. The vertical line DD' shows a perfectly inelastic demand.

In other words, in this case elasticity of demand is zero. No amount of change in price induces a change in demand as shown in below figure.

Zero Elasticity

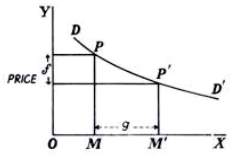
In the real world, there is no commodity the demand for which might be absolutely inelastic i.e., changes in its price will fail to bring about any change at all in the demand for it. Some extension/contraction is bound to occur that is why economists say that elasticity of demand is a matter of degree only.

In a similar way, there are couple of products for whose situation the request is flawlessly versatile. Thus, in real life the elasticity of demand of most goods and services lies between the two limits

given above viz., infinity and zero. Some have highly elastic demand while others have less elastic demand.

(c) Very elastic demand

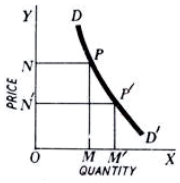
Demand is said to be very elastic when even a small change in the price of a commodity leads to a considerable extension/con-traction of the amount demanded of it. DD' curve represents such a demand as shown in below figure. As a result of change of T in the price, the quantity demanded extends/contracts by MM' which clearly is comparatively a large change in demand.



Very Elastic Demand

(d) Less elastic demand

When even a substantial change in price brings only a small extension/contraction in demand it is said to be less elastic. In figure, DD' represents less elastic demand. A fall of NN' in price extends demand by MM' only which is very small.



Less Elastic Demand

1.3.2 Demand forecasting and Methods of forecasting

Demand Forecasting is a systematic and scientific estimation of future demand for a product. Simply, estimating the sales proceeds or demand for a product in the future is called as demand forecasting.

There are several methods of demand forecasting applied in terms of; the purpose of forecasting, data required, data availability and the time frame within which the demand is to be fore-casted. Each method varies from one another and hence the forecaster must select that method which best suits the requirement.

There are many assumptions about forecasting.

There is none other way to state what the future will be with complete certainty. Regardless of the methods that we use there will always be an element of uncertainty until the forecast horizon has come to pass.

There will always be blind spots in forecasts. For example: Forecast completely new technologies for which there are no existing paradigms.

Providing forecasts to policy makers will help them formulate social policy. The new social policy in turn will affect the future thus changing the accuracy of the forecast.

i. Opinion polling methods

a. Experts opinion method

Genius forecasting

This method is based on a combination of intuition, insight and luck. Psychics and crystal ball readers are the most extreme case of genius forecasting. Their forecasts are based exclusively on intuition. Science fiction writers have sometimes described new technologies with uncanny accuracy.

b. Consumer 's survey method

In this method consumer's are contacted personally to disclose their future plans so that we can able to forecast the future because they are ultimate targeters/buyers.

c. Complete enumeration survey

Here all the units of consumers are taken into account without any cut-shorts. So here large number of consumers will be there to get the unbiased information. The main benefit of this method is its accuracy and its main drawback is it is time consuming one.

d. Survey method

Here from the total population certain number of units will be selected as sample units then the opinion collection will be made. This method is less tedious and less costly than the above method.

ii. Statistical Methods

Fitting trend line by observation. This method of estimating trend is elementary, easy and quick.

It involves merely plotting of annual sales on graph and then estimating just by observation where the trend line lies.

a. Trend extrapolation

These methods examine trends and cycles in historical data and then use mathematical techniques to extrapolate to the future. The assumption of all these techniques is that the forces responsible for creating the past will continue to operate in the future.

This is often a valid assumption when forecasting short term horizons but it falls short when creating medium and long term forecasts.

b. Simulation methods

Simulation methods involve using analogs to model complex systems. These analogs can take on several forms. A mechanical analog might be a wind tunnel for modeling aircraft performance. An equation to predict an economic measure would be a mathematical analog.

A metaphorical analog could involve using the growth of a bacteria colony to describe human population growth. Game analogs are used where the interactions of the players are symbolic of social interactions.

c. Trend analysis

Uses linear and nonlinear regression with time as the explanatory variable, it is used where pattern over time have a long term trend. Unlike most time series forecasting techniques the trend analysis does not assume the condition of equally spaced time series.

d. Simple moving averages

The best-known forecasting methods is the moving averages or simply takes a certain number of past periods and add them together; then divide by the number of periods. Simple Moving Averages (MA) is effective and efficient approach provided, the time series is stationary in both mean and variance. The following formula is used in finding the moving average of order n, MA(n) for a period t+1.

e. Exponential smoothing techniques

It is one of the most successful forecasting method. Moreover it can be modified efficiently to use effectively for time series with seasonal patterns. It is also easy to adjust for past errors, easy to prepare follow on forecasts ,ideal for situations where several forecasts must be prepared, several different forms are used depending on presence of trend or cyclical variations. In short an ES is an averaging technique that uses unequal weights however, the weights applied to past observations decline in an exponential manner.

f. Least squares method

To predict the mean y-value for a given x-value, we need a line which passes through the mean value of both x and y and which minimizes the sum of the distance between each of the points and the predictive line. Such an approach should result in a line which we can call a best fit to the sample data.

The least-squares method achieves this output by calculating the minimum average squared deviations between the sample y points and the estimated line. A procedure is used for finding the values of a and b which decreases to the solution of simultaneous linear equations. Shortcut formulas have been developed as an alternative to the solution of simultaneous equations.

Regression and Moving Average (MA)

When a time series is not a straight line one might use the Moving Average (MA) and breakup the time series into several intervals with common straight line with positive trends to achieve linearity for the whole time series. The process involves transformation based on slope and then a moving average within that interval.

1.3.3 Concept of Supply and Law of Supply

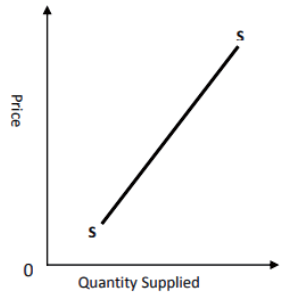
Law of Supply

The functional relationship between price and quantity supplied is called the law of supply. According to the law of supply, as the price of the commodity falls, the quantity supplied decreases or alternatively, as the price of the commodity rises the quantity supplied increases, other things being equal. Therefore, there is a direct relationship between the commodity and quantity supplied.

The law of supply can be illustrated through a supply schedule and supply curve. Supply schedule is a table that shows various quantities of a good or service that sellers are willing and able to offer for sale at various possible prices during some specified period. A supply schedule is presented in the below table.

Price	Quantity Supplied
5	40
10	60
15	80
20	100
25	120

Supply schedule shows that as price rises, a greater quantity is offered for sale. By plotting the information contained in the supply schedule on a graph we can derive the supply curve as shown below.

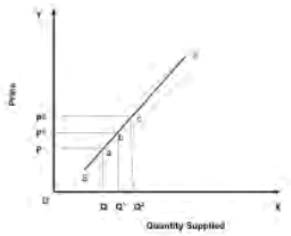


The supply curve is a graph showing various quantities of a good or service that sellers are willing and able to offer for sale at various possible prices. The supply curve slopes upwards because of the direct relationship between price and quantity supplied. It is known that the entire supply curve represents supply while a point on the supply curve represents quantity supplied at some specific price.

The main reason for direct relationship between price and quantity supplied is that higher prices serve as an incentive for sellers to offer greater quantity for sale. The sellers or producers can be induced to produce and offer a greater quantity for sale by higher prices.

It is assumed that sellers or producers aim to maximize profit from the production and sale of the commodity. The higher the prices of the commodity, other things being equal, the greater the potential gain producers can expect from producing and supplying it in the market. Moreover, increases in price may invite new suppliers in the market.

Supply Curve: A graphical representation of how much of a commodity a firm sells at different prices is shown below. The supply curve is upward sloping from left to right. Therefore the price elasticity of supply will be positive.



Graph - Supply curve

Determinants of Supply:

1. The cost of factors of production: Cost depends on the price of factors. Increase in factor cost increases the cost of production and reduces supply.

2. The state of technology: Use of advanced technology increases productivity of the organization and increases its supply.

3. External factors: External factors like weather influence the supply. If there is a flood, this reduces supply of various agricultural products.

4. Tax and subsidy: Increase in government subsidies results in more production and higher supply.

5. Transport: Better transport facilities will increase the supply.

6. Price: If the prices are high, the sellers are willing to supply more goods to increase their profit.

7. Price of other goods: The price of other goods is more than 'X' then the supply of 'X' will be increased.

Market Supply Schedule and Market Supply Curve

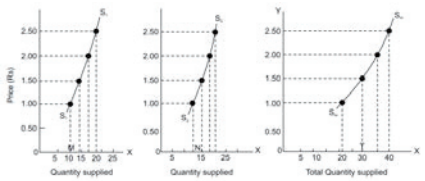
In order to find out the market demand schedule and the market demand curve, we aggregate the individual demand schedules and individual demand curves. Similarly, we can find out the market supply schedule and the market supply curve of a commodity by aggregating the individual supply schedules and individual supply curves of all the firms which are supplying that commodity.

Suppose for the sake of simplicity, there are only two firms A and B which are supplying ball pens in the market. The table below, gives the different quantities of ball pens supplied by the firms A and B at different prices.

Price (per ball-pen)	Quantities supplied Ball pens(dozens)	Market Supply (Total quantities supplied)

(Rs.)			(A + B)
	A	B	
1.00	10	11	21
1.50	14	15	29
2.00	17	18	35
2.50	19	20	39

If we represent the supply schedule given in the above table on a diagram, we can find out the market supply curve of ball pens as shown in the below figure.



Comparison of Market Supply Schedule and Market Supply Curve

In the above figure, the market supply curve S_m has been obtained by aggregating the supply curve of firms A and B and shown in the above figures(a) and (b) above respectively. For instance at price Rs. 1.50 per ball pen, firm A supplies 14 ball pens (OM quantity) and firm B supplies 15 ball pens (ON quantity).

Therefore, the total market supply will be 29 ball pens (OT quantity) at price Rs. 1.50 per ball pen. The market supply curve also shows the direct relationship between the price of a commodity and its quantities supplied. More of a commodity will be supplied at a higher price and less at a lower price.

Market supply schedule of a commodity

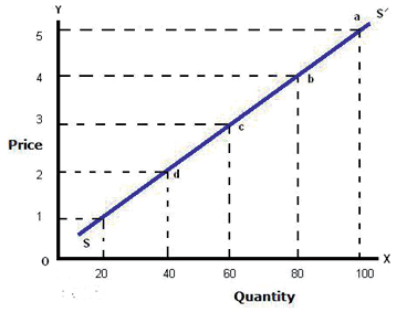
(In Rupees)

P_x	4	3	2	1
Q_x^S	100	80	60	40

In the table above, the produce are able and willing to offer for sale 100 units of a commodity at price of Rupees 4. As the price falls the quantity offered for sale decreases. At price of Rupee 1 the quantity offered for sale is only 40 units.

Law of Supply Curve/Diagram

The market supply data of the commodity x as shown in the supply schedule is now presented graphically.



Law of supply curve

In the above figure, price is plotted on the vertical axis OY and the quantity supplied on the horizontal axis OX. The four points d, c, b and a show each price quantity combination. The supply curve $SS^{/}$ slopes upward from left to right indicating that less quantity is offered for sale at lower price and more at higher prices by the sellers.

Formula for Law of Supply/Supply Function

The supply function can also be expressed in symbols.

$Qx^S = \phi (P_x Tech, S_i, F_n, X,.....)$

where,

Q_x^S = Quantity supplied of commodity x by the producers

ϕ = Function

P_x = Price of commodity x

Tech = Technology

S = Supplies of inputs

F = Features of nature

X = Taxes/Subsidies.

Example of Law of Supply

The law of supply is based on a moving quantity of materials available to meet a particular need. Supply is the source of economic activity. Supply or the lack of it, also dictates prices. Cost of scarce supply goods increase in relation to the shortages.

Supply can be used to measure demand. Over supply results in lack of customers. It is consistently an adversity of an oversupply and under supply produces a request as requests or optional deals at higher costs.

If ten people want to buy a pen and there only one pen the sale will be based on the level of demand for the pen. The function of supply requires more pens which creates more generation to take care of demand.

Assumptions of Law of Supply

(i) Nature of Goods: If the goods are perishable in nature and the seller cannot wait for the rise in price. Seller may have to offer all of his goods at current market price because he may not take risk of getting his commodity perished.

(ii) Government Policies: Government may enforce the firms and producers to offer production at prevailing market price. In such a situation producer may not be able to wait for the rise in price.

(iii) Alternative Products: If a number of alternative products are available in the market and customers tend to buy those products to fulfill their needs, the producer will have to shift to transform his resources to the production of those products.

(iv) Squeeze in Profit: Production costs like raw materials, labor costs, overhead costs and selling and administration may increase along with the increase in price. In this situations may not allow producer to offer his products at a particular increased price.

Limitations/Exceptions of Law of Supply

Exceptions that affect law of supply may include the following points,

(i) Ability to move stock.

(ii) Legislation restricting quantity.

(iii) External factors that influence your industry.

Importance of Law of Supply

(i) Supply responds to changes in prices differently for different goods depending on their elasticity or inelasticity. When goods are versatile when an unobtrusive change in value prompts an extensive change in the amount provided.

In contrast, goods are inelastic when a change in price leads to relatively no response to the quantity supplied.

For example: An elastic good would be soft drinks and an inelastic service would be physician's services. Producers will be more likely to want to supply more inelastic goods such as gas because they will most likely profit more off of them.

(ii) Law of supply is an economic principle that states that there is a direct relationship between the price of a good and how much producers are willing to supply.

(iii) As the price of a good increases, suppliers will want to supply more of it. However, as the price of a good decreases, suppliers will not want to supply as much of it. For producers to want to produce a good, the incentive of profit must be greater than the opportunity cost of production, the total cost of producing the good, which includes the resources and value of the other goods that could have been produced instead.

(iv) Entrepreneurs enter business ventures with the intention of making a profit. A profit occurs when the revenues from the goods ,a producer supplies exceeds the opportunity cost of their production. Though consumer must value the goods at the price offered in order for them to buy them.

Therefore, in order for a consumer to be willing to pay a price for a good higher than its cost of production he or she must value that good more than the other goods that could have been produced instead.

So, supplier profits are dependent on consumer demands and values. However when suppliers do not earn enough revenue to cover the cost of production of the good they incur a loss. Losses occur whenever consumers value a good less than the other goods that could have been produced with the same resources.

Determinants of supply

There are four important determinants of supply as under,

(i) Technology changes: Technology helps a producer to minimize his cost of production.

(ii) Resource supplies: The producer also has to pay for other resources such as raw materials and labor. If his money is short on supplying a certain number of products because of an increase in resource supplies, then he has to reduce his supply.

(iii) Tax/Subsidy: A producer aims to maximize his profit, but an increase in tax will only increase his expenses, decreasing his capacity to buy resource supplies and forcing him to reduce his supply.

(iv) Price of other goods produced: A producer may not only produce one product but other products as well. A producer's money is limited and if he increases his supply in one product, he would have to decrease his supply in the other product, no unless his sales increase.

Thus,

$Q_x^S = \phi (P_x)$ Ceteris Paribus

Ceteris Paribus: In economics, the term is used as a shorthand for indicating the effect of one economic variable on another, holding constant all other variables that may affect the second variable.

2

PRODUCTION AND COST ANALYSIS

Concept of Production function- Cobb-Douglas Production function- Leontief production function - Law of Variable proportions-Isoquants and Isocosts and choice of least cost factor combination- Concepts of Returns to scale and Economies of scale-Different cost concepts: opportunity costs, explicit and implicit costs- Fixed costs, Variable Costs and Total costs -Cost -Volume-Profit analysis- Determination of Breakeven point(simple problems)-Managerial significance and limitations of Breakeven point.

2.1 Concept of Production function - Cobb-Douglas Production function - Leontief production function - Law of Variable proportions - Isoquants and Isocosts and choice of least cost factor combination

Production is the result of co-operation of four factors of production viz., land, labour, capital and organization.

This is evident from the fact that no single commodity can be produced without the help of any one of these four factors of production.

Therefore, the producer combines all the four factors of production in a technical proportion. The aim of the producer is to maximize his profit. For this sake, he decides to maximize the production at minimum cost by means of the best combination of factors of production.

The producer secures the best combination by applying the principles of equi-marginal returns and substitution. According to the principle of equi-marginal returns, any producer can have maximum production only when the marginal returns of all the factors of production are equal to one another. For instance, when the marginal product of the land is equal to that of labour, capital and organization, the production becomes maximum.

In simple words, production function refers to the functional relationship between the quantity of a good produced (output) and factors of production (inputs).

“The production function is purely a technical relation which connects factor inputs and output.” Prof. Koutsoyiannis.

Defined production function as “the relation between a firm’s physical production (output) and the material factors of production (inputs).” Prof. Watson

In this way, production function reflects how much output we can expect if we have so much of labour and so much of capital as well as of labour etc. In other words, we can say that production function is an indicator of the physical relationship between the inputs and output of a firm.

The production function relates the result of a firm to the amount of inputs, typically capital and labor.

In a general mathematical form of production function can be expressed as,

Q = f(X1,X2,X3,...,Xn)

where,

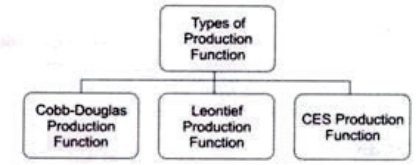
Q = quantity of output

X1,X2,X3,...,Xn = quantities of factor inputs (such as capital, labour, land or raw materials).

This general form does not encompass joint production. That is a production process that has multiple coproducts or outputs.

Production function is the mathematical representation of relationship between physical inputs and physical outputs of an organization.

There are different types of production functions that can be classified according to the degree of substitution of one input by the other.



Types of production function

Cobb Douglas production function

The Cobb-Douglas production function represents the relationship between two or more inputs - typically physical capital and labor - and the number of outputs that can be produced. It's a commonly used function in macroeconomics and forecast production.

n 1928, Charles Cobb and Paul Douglas presented the view that production output is the result of the amount of labor and physical capital invested. This analysis produced a calculation that is still in use today, largely because of its accuracy.

The Cobb Douglas production function is a particular form of the production function. It is widely used because it has many attractive characteristics as mentioned below.

The basic form of the Cobb-Douglas production function is as follows,

$Q(L,K) = A\ L^{\beta}\ K^{\alpha}$

where,

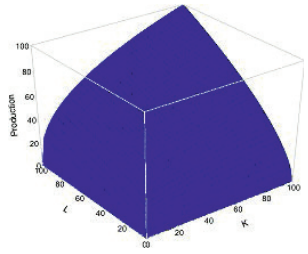
Q - is the quantity of products

L - is the quantity of labor

K - is the quantity of capital

A - is a positive constant

β - and α are constants between 0 and 1.



Cobb-Douglas Production function

Marginal product

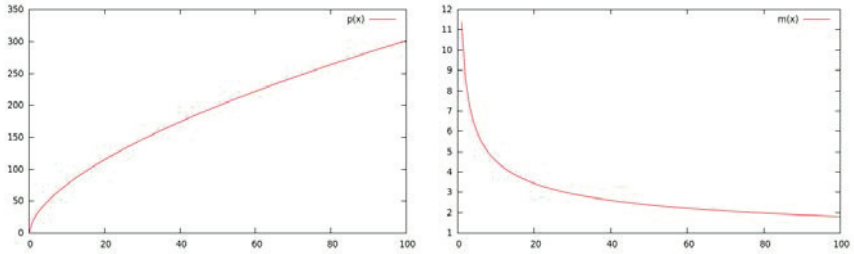
Marginal product is the change in total production when there is an infinitesimal change in the inputs. Marginal product is the first derivative of the production function with respect to an input.

$\partial Q/\partial L$

In the case of the Cobb-Douglas production function,

$\partial Q/\partial L = A\beta\ L^{(\beta-1)}\ K^{\alpha}$

We can see that, if L or K increases the total output will increase that is the marginal product is positive. As we can see in the following plots the marginal product is decreasing.



Output Elasticity

Output elasticity is the percentage change in output in response to a change in levels of either labor or capital.

$(\partial Q/Q) / (\partial L/L) = (\partial Q/\partial L)/(Q/L)$

If output elasticity is greater than 1 the production function is elastic and vice versa. In the case of the Cobb-Douglas production function, output elasticity can be measured quite easily.

$(\partial Q/Q) / (\partial L/L) = (\partial Q/\partial L) / (Q/L)$

$= [A\beta L^{(\beta-1)} K\alpha] / [A L^{\beta} K^{\alpha} / L]$

$= [A\beta L^{(\beta-1)} K^{\alpha}] / [A L^{(\beta-1)} K^{\alpha}]$

$= \beta$

Output elasticity with respect to labor is constant and equal to β. If β is 0.2 and labor increases in 10%, output will increase 2%. α and β are output elasticities of capital and labor and are constant.

Production Optimization

Benefits

An accurate forecast of future cash flows and associated risks.

Cost savings by avoiding unnecessary attention to areas that are non-critical and improved focus on areas of higher value.

Discovery of enhancement opportunities during the conceptual and design phase rather than later in the project's life cycle, when the cost of change is considerably higher.

Systematic identification of key technological risks for a specific concept and setting of priorities for further technology development, qualification and testing (to reduce and manage these risks).

Improved insight into technical and managerial issues that may cause critical failures and production losses.

A road map on how to improve production capacities and production availability based on risk and cost benefit assessments.

Important parameters include,

a. Production capacity profiles

b. Demand profiles and product prices

c. Physical asset layout and design

d. Equipment reliability performance

e. Maintenance and repair activities including spare part strategies

f. Operation and mobilization activities.

Managerial uses of production function

1. To find the most profitable rate of operation of the firm.

2. To determine the optimum quantity of output to be produced and supplied.

3. To determine in advance the cost of business operations.

4. To locate weak points in production management to minimize costs.

5. To fix the price of the product.

6. To decide what sales channel to use.

7. To have a clear understanding of alternative plans and the right costs involved in them.

8. To have clarity about the various cost concepts.

9. To decide and determine the very existence of a firm in the production field.

10. To regulate the number of firms engaged in production.

11. To decide about the method of cost estimation or calculations.

12. To find out decision making costs by reclassifications of elements, reprising of input factors etc, so as to fit the relevant costs into management planning, choice etc.

2.1.1 Leontief production function

The production function which represents employment of fixed proportion of inputs and does not allow any substitution among inputs is known as Leontieff production function. It is regarded as the limiting case for constant elasticity of substitution.

The isoquants which represent Leontieff production function are 'L' shaped. Leontieff production function is expressed as,

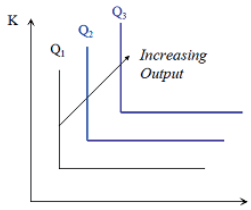
$Q = \text{Min.} (I_1 / a, I_2 / b)$

where,

Q = Quantity of output

I_1, I_2 = quantities of inputs employed

a, b = requirements of I_1 and I_2 respectively to produce one unit of output



Leontief production function curve

Q = min{aK, bL}

• Capital and labor are perfect complements and cannot be substituted (no MRTS <=> no slope).

• Capital and labor are used in fixed-proportions.

• Both inputs are needed to produce output.

Let us take a numerical example to illustrate the meaning of the symbolical representation of Leontieff production function.

Suppose, 20 units of input I and 50 units of input II are employed to manufacture a particular product. If 10 units of input I and 5 units of input II are required to produce one unit of output, then using Leontieff production function, quantity of output can be determined as,

Q = Min. (20 / 10, 50 / 5)

= Min. (2, 10)

= 2 units.

Total quantity of output is 2 units. So, total quantity of input I and 10 units of input II will be utilized.

2.1.2 Law of Variable proportions

Definitions:

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

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

"The law of variable proportion states that if the inputs of one resource is increased by equal increment per unit of time while the inputs of other resources are held constant, total output will increase, but beyond some point the resulting output increases will become smaller and smaller." Leftwitch

Assumptions:

Law of variable proportions is based on following assumptions:

(i) Constant Technology:

The state of technology is assumed to be given and constant. If there is an improvement in technology the production function will move upward.

(ii) Factor Proportions are Variable:

The law assumes that factor proportions are variable. If factors of production are to be combined in a fixed proportion, the law has no validity.

(iii) Homogeneous Factor Units:

The units of variable factor are homogeneous. Each unit is identical in quality and amount with every other unit.

(iv) Short-Run:

The law operates in the short-run when it is not possible to vary all factor inputs.

The behaviour of the law of variable proportions or of the short run production function when one factor is constant and the other variable can also be explained in terms of the isoquant analysis. The capital is a fixed factor and labour is a variable factor.

In OA and OB are the ridge lines and it is in between them that economically feasible units of labour and capital can be employed to produce 100, 200, 300, 400 and 500 units of output as shown in the below figure.

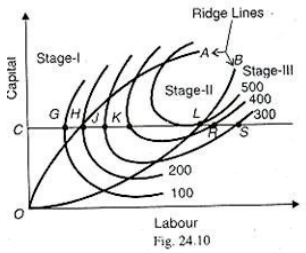


Fig. 24.10

It implies that in these parts of the isoquants, the marginal product of labour and capital is positive. On the opposite hand, wherever these ridge lines cut the isoquants the marginal product of the inputs is zero.

For example: At purpose H the marginal product of capital is zero and at purpose L the marginal product of labour is zero. The portion of the isoquant that lies outside the ridge lines, the marginal product of that issue is negative. For example: The marginal product of capital is negative at G which of labour at R.

The law of variable proportions says that, given the technique of production, the application of more and more units of a variable factor, say labour, to a fixed factor, say capital, will yield more than proportional increases in output, and thereafter less than proportional increases in out-put.

Since the law refers to increases in output it relates to the marginal product. To explain, the law capital is taken as a fixed factor and labour as a variable issue. The isoquants show various levels of output in above figure.

OC is the fixed quantity of capital which therefore forms a horizontal line CD. As we move from C to D towards the right on this line the different points show the effects of the combinations of successively increasing quantities of labour with fixed amount of capital OC.

To begin with as we have a tendency to move from C to G to H, it shows the primary stage of accelerating marginal returns of the law of variable proportions. Once CG labour is utilized with OC capital, output is one hundred. To provide two hundred units of output, labour is multiplied by GH whereas the number of capital is fastened at OC.

The output has doubled but the number of labour employed has not increased proportionately. It may be observed that GH < CG, which means that smaller additions to the labour force have led to equal increment in output.

Thus, C to H is the first stage of the law of variable proportions in which the marginal product increases because output per unit of labour increases a lot of output is produced.

The second phase of the law of variable extents is that the segment of the isoquants which lies in the middle of the two edge lines OA and OB. It is the stage of diminishing marginal returns between points H and L.

As a lot of labour is employed output increases less than proportionately to the increase in the labour employed. To raise output to 300 units from two hundred units HJ labour is employed. Further JK quantity of labour is required to raise output from 300 to 400 and KL of labour to raise output from 400 to 500.

So to increase output by 100 units successively and more than units of the variable issue (labour) are required to be applied along with the fixed factor (capital) that is KL > JK > HJ. It suggests that the negligible result of work keeps on declining with the work of bigger amounts to it.

Along these lines as we move from point H toward K the impact of expanding the units of work is that yield per unit of work decreases as more output is created. This is known as the stage of diminishing returns.

We are outside the lower ridge line OB and enter the third stage of the law of variable proportions. In this region which lies beyond the ridge line OB there is too much of the variable factor (labour) in relation to the fixed factor (capital).

The labour is thus being overworked and its marginal product is negative. In other words, when the quantity of labour is increased by LR and RS, the output declines from 500 to 400 and to 300. This is the stage of negative marginal returns.

Thus we can conclude that a firm will find it profitable to produce only in the second stage of the law of variable proportions because it will be uneconomical to produce in the regions to the left or right of the ridge lines which form the first stage and the third stage of the law respectively.

2.1.3 Isoquants and Isocosts and choice of least cost factor combination

The least cost combination of-factors or producer's equilibrium is now explained with the help of iso-product curves and isocosts. The optimum factors combination or the least cost combination refers to the combination of factors with which a firm can produce a specific quantity of output at the lowest possible cost.

As we know, there are a number of combinations of factors which can yield a given level of output. The producer has to choose, one combination out of these which yields a given level of output with least possible outlay. The least cost combination of factors for any level of output is that where the iso-product curve is tangent to an isocost curve. The analysis of producers equilibrium is based on the following assumptions.

Assumptions of Optimum Factor Combination:

The main assumptions on which this analysis is based areas under:

(a) There are two factors X and Y in the combinations.

(b) All the units of factor X are homogeneous and so is the case with units of factor Y.

(c) The prices of factors X and Y are given and constants.

(d) The total money outlay is also given.

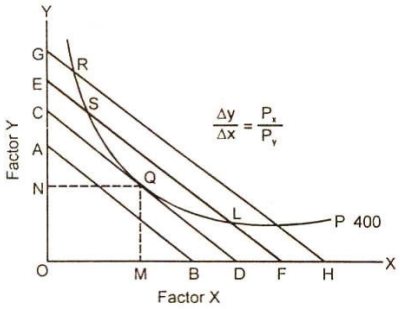
(e) In the factor market, it is the perfect completion which prevails. Under the conditions assumed above, the producer is in equilibrium, when the following two conditions are fulfilled.

(1) The isoquant must be convert to the origin.

(2) The slope of the Isoquant must be equal to the slope of isocost line.

Diagram/Figure:

The least cost combination of factors is now explained with the help of below figure:



Here the isocost line CD is tangent to the iso-product curve 400 units at point Q. The firm employs OC units of factor Y and OD units of factor X to produce 400 units of output. This is the optimum output which the firm can get from the cost outlay of Q. In this figure any point below Q on the price line AB is desirable as it shows lower cost, but it is not attainable for producing 400 units of output. As regards points RS above Q on isocost lines GH, EF, they show higher cost.

These are beyond the reach of the producer with CD outlay. Hence point Q is the least cost point. It is the point which is the least cost factor combination for producing 400 units of output with OC units of factor Y and OD units of factor X. Point Q is the equilibrium of the producer.

At this point, the slope of the isoquants equal to the slope of the isocost line. The MRT of the two inputs equals their price ratio.

Thus we find that at point Q, the two conditions of producer's, equilibrium in the choice of factor combinations, are satisfied.

(1) The isoquant (IP) is convex the origin.

(2) At point Q, the slope of the isoquant $\Delta Y / \Delta X$ ($MTYS_{xy}$) is equal to the slope of the isocost in P_x / P_y. The producer gets the optimum output at least cost factor combination.

2.2 Concepts of Returns to scale and Economies of scale - Different cost concepts - Opportunity costs: Explicit and implicit costs - Fixed costs, Variable Costs

The law of returns are often confused with the law of returns to scale. The law of returns operates in the short period. It explains the production behavior of the firm with one factor variable while other factors are kept constant. Whereas the law of returns to scale operates in the long period. It explains the production behavior of the firm with all variable factors.

There is no fixed factor of production in the long run. The law of returns to scale describes the relationship between variable inputs and output when all the inputs, or factors are increased in the same proportion. The law of returns to scale analysis the effects of scale on the level of output. Here we find out in what proportions the output changes when there is proportionate change in the

quantities of all inputs. The answer to this question helps a firm to determine its scale or size in the long run.

It has been observed that when there is a proportionate change in the amounts of inputs, the behavior of output varies. The output may increase by a great proportion, by in the same proportion or in a smaller proportion to its inputs. This behavior of output with the increase in scale of operation is termed as increasing returns to scale, constant returns to scale and diminishing returns to scale. These three laws of returns to scale are now explained, in brief, under separate heads.

(1) Increasing Returns to Scale:

If the output of a firm increases more than in proportion to an equal percentage increase in all inputs, the production is said to exhibit increasing returns to scale.

For example, if the amount of inputs are doubled and the output increases by more than double, it is said to be an increasing returns returns to scale. When there is an increase in the scale of production, it leads to lower average cost per unit produced as the firm enjoys economies of scale.

(2) Constant Returns to Scale:

When all inputs are increased by a certain percentage, the output increases by the same percentage, the production function is said to exhibit constant returns to scale.

For example, if a firm doubles inputs, it doubles output. In case, it triples output. The constant scale of production has no effect on average cost per unit produced.

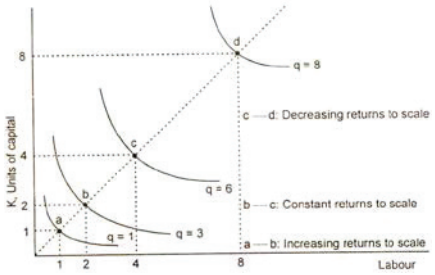
(3) Diminishing Returns to Scale:

The term 'diminishing' returns to scale refers to scale where output increases in a smaller proportion than the increase in all inputs.

For example, if a firm increases inputs by 100% but the output decreases by less than 100%, the firm is said to exhibit decreasing returns to scale. In case of decreasing returns to scale, the firm faces diseconomies of scale. The firm's scale of production leads to higher average cost per unit produced.

Graph/Diagram:

The three laws of returns to scale are now explained with the help of a graph below:

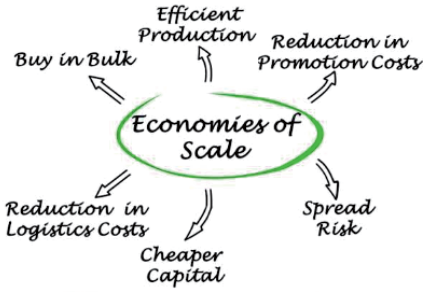


The figure shows that when a firm uses one unit of labor and one unit of capital, point a, it produces 1 unit of quantity as is shown on the q = 1 isoquant. When the firm doubles its outputs by using 2 units of labor and 2 units of capital, it produces more than double from q = 1 to q = 3.

So the production function has increasing returns to scale in this range. Another output from quantity 3 to quantity 6. At the last doubling point c to point d, the production function has decreasing returns to scale. The doubling of output from 4 units of input, causes output to increase from 6 to 8 units increases of two units only.

Economies of Scale

Economies of Scale refer to the cost advantage experienced by a firm when it increases its level of output. The advantage arises due to the inverse relationship between per-unit fixed cost and the quantity produced. The greater the quantity of output produced, the lower the per-unit fixed cost. Economies of scale also result in a fall in average variable costs (average non-fixed costs) with an increase in output. This is brought about by operational efficiencies and synergies as a result of an increase in the scale of production.



Economies of scale can be implemented by a firm at any stage of the production process. Production here refers to the economic concept of production and involves all activities related to the commodity not involving the final buyer. Thus, a business can decide to implement economies of scale in its marketing division by hiring a large number of marketing professionals. A business can also adopt the same in its input sourcing division by moving from human labor to machine labor.

Effects of Economies of Scale on Production Costs

It reduces the per unit fixed cost. As a result of increased production, the fixed cost gets spread over more output than before.

It reduces the per unit variable costs. Economies of scale bring down the per unit variable costs. This occurs as the expanded scale of production increases the efficiency of the production process.

The graph above plots the long run average costs faced by a firm against its level of output. When the firm expands its output from Q to Q2, its average cost falls from C to C1. Thus, the firm can be said to experience economies of scale up to output level Q2. (In economics, a key result that emerges from the analysis of the production process is that a profit-maximizing firm always produces that level of output which results in the least average cost per unit of output).

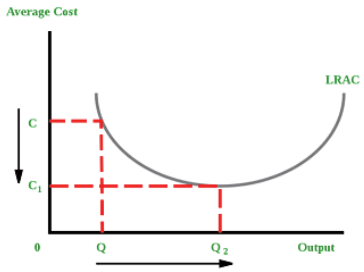
Types of Economies of Scale

1. Internal Economies of Scale

They refer to economies that are unique to a firm. For instance, a firm may hold a patent over a mass production machine, which allows it to lower its average cost of production more than other firms in the industry.

2. External Economies of Scale

They refer to economies of scale faced by an entire industry. For instance, suppose the government wants to increase steel production. In order to do so, the government announces that all steel producers who employ more than 10,000 workers will be given a 20% tax break. Thus, firms employing less than 10,000 workers can potentially lower their average cost of production by employing more workers. This is an example of an external economy of scale – one that affects an entire industry or sector of the economy.



Sources of Economies of Scale

1. Purchasing

Firms might be able to lower average costs by buying the inputs required for the production process in bulk or from special wholesalers.

2. Managerial

Firms might be able to lower average costs by improving the management structure within the firm. The firm might hire better skilled or more experienced managers.

3. Technological

A technological advancement might drastically change the production process. For instance, fracking completely changed the oil industry a few years ago. However, only large oil firms that could afford to invest in expensive fracking equipment could take advantage of the new technology.

2.2.1 Different cost concepts:

Concept of opportunity cost is closely related to the concept of economic profit or economic Rent. The industry earns or makes economic profit only when besides covering different costs of operation a firm is also able to earn more than its opportunity cost (or its possible earnings under the next best investment alternative). Opportunity cost is also termed as Implicit cost.

Economic Profit is thus earned only when following is true for methods of costing.

Different industries follow different methods to establish the cost of their product. This differs by the nature and specifics of each business. There are different principles and procedures for performing the costing. However, the basic principles and procedures of costing remain the same. Some of the methods are mentioned below,

- Job costing
- Unit costing
- Batch costing
- Contract costing
- Process costing
- Operating costing
- Multiple costing
- Uniform costing

Different methods of costing

Job costing

According to this method, costs are ascertained for each work order separately as each job has its own specifications and scope. Job costing is used in painting, car repair, decoration and building repair.

Unit costing

This method is also called as single output costing. The specific service is dealt with as a different unit in working costing. Unit costing is suitable for products that are manufactured by continuous manufacturing activity.

For example: brick making, mining, cement manufacturing, dairy operations or flour mills. Costs are ascertained for convenient units of output.

Batch costing

This method of costing is used where units produced in a batch are uniform in nature and design. For the purpose of costing each batch is treated as an individual job or separate unit. Industries like bakeries and pharmaceuticals usually use the batch costing method.

Contract costing

Contract costing is performed for big jobs involving heavy expenditure, long periods of time and often different work sites. Each contract is treated as a separate unit for costing. This is also known as terminal costing. Projects requiring contract costing include construction of bridges, roads and buildings.

Process costing

This kind of costing is used for products that go through different processes. For example: The manufacturing of clothes involves many processes. The first process is spinning. The output of that spinning process is a finished product yarn which can either be sold in the market to weavers or used as a raw material for a weaving process in the same manufacturing unit. To find out the cost of the yarn one requires to determine the cost of the spinning process.

In the second step, the output of the weaving process, cloth can also can be sold as a finished product in the market. In this case, the cost of cloth needs to be evaluated. The third process is converting the cloth to a finished product.

For example: A shirt or pair of trousers. Each process that can result in either a finished good or a raw material for the next process should be evaluated separately. In such multi process industries process costing is used to ascertain the cost at each stage of production.

Operating costing or Service costing

Operating or Service costing is used to ascertain the cost of particular service oriented units such as nursing homes, buses or railways. The specific service is dealt with as a different unit in working

costing. In the case of a nursing home a unit is treated as the cost of a bed per day, while, for buses, operating cost for a kilometer is treated as a unit.

Uniform costing

This is not a separate method of costing but rather a system in which a number of firms in the same industry use the same method of costing using agreed on principles and standard accounting practices. This helps in setting the price of the product and in inter firm comparisons.

Multiple costing or Composite costing

When the output is comprised of many assembled parts or components as with television, motor cars or electronics gadgets, costs have to be ascertained for each component, as well as with the finished product. Such costing may involve different methods of costing for different components. Therefore this type of costing is known as Composite costing or Multiple costing.

Approaches to Cost accounting

Different cost accounting techniques are used in various industries to analyze and present costs for the purposes of control and managerial decisions.

The generally used types of costing are as follows,

1. Absorption costing

2. Marginal costing

Absorption costing

In absorption costing, the full costs (that is, both fixed and variable costs) are absorbed into production.

Marginal costing

Marginal costing entails the allocation of only variable costs i.e., direct materials, direct labour and other direct expenses and variable overheads to the production. It does not take into account the fixed cost of production. This type of costing emphasizes the distinction between fixed and variable costs.

Historical costing

Historical costing unlike standard costing uses actual costs determined after they have been incurred. Almost all organizations use the historical costing system of accounting for costs.

Standard costing

In standard costing a cost is predicted in advance of production based on predetermined standards under a given set of operating conditions. The expenses of standard are compared with real costs occasionally and reconsidered to stay away from misfortunes because of obsolete costing.

Traditional costing approach

The traditional method of cost accounting refers to the allocation of manufacturing overhead costs to the products manufactured. The traditional method is also known as the conventional method.

The traditional method assigns or allocates the factory's indirect costs to the items manufactured on the basis of volume such as the number of units produced the direct labor hours or the production machine hours. We will use machine hours in our discussion.

By using only machine hours to allocate the manufacturing overhead to products it is implying that the machine hours are the underlying cause of the factory overhead. Traditionally that might have been reasonable or at least sufficient for the company's external financial statements.

However in recent decades the manufacturing overhead has been driven or caused by several other factors. For example: Some customers are likely to demand additional manufacturing operations for their diverse products. Other customers simply want great quantities of uniform products.

If a manufacturer wants to know the true cost to produce specific products for specific customers, the traditional method of cost accounting is inadequate. Activity Based Costing (ABC) was developed to overcome the shortcomings of the traditional method.

Instead of just one cost driver such as machine hours, Activity Based Costing (ABC) will use many cost drivers to allocate a manufacturer's indirect costs. Little of the cost drivers that would be used under Activity Based Costing (ABC) include the number of machine setups, the pounds of material purchased or used, the number of engineering change orders, the number of machine hours and so on.

Activity Based Costing

Activity Based Costing (ABC) is a methodology for more precisely allocating overhead to those items that actually use it. The system can be used for the targeted reduction of overhead costs. Activity Based Costing (ABC) works best in complex environments, where there are several machines and products and tangled processes that are not easy to sort out. Conversely, it is of less use in a streamlined environment where production processes are abbreviated.

2.2.2 Opportunity costs: Explicit and implicit costs

Opportunity cost

Definition: An opportunity cost is the economic concept of potential benefits that a company gives up by taking an alternative action. In other words, this is the potential benefit you could have received if you had taken action A instead of action B.

Each business transaction and strategy has benefits related to it, but businesses must choose a specific action. By choosing one alternative, companies lose out on the benefits of the other alternatives. In other words, opportunity costs are not physical costs at all. They are theoretical costs or missed opportunities.

The resources of any firm operating in the market are limited and investment options are several. The firm therefore has to decide or select only those investment opportunities/options which provide the firm with the best return or best income on investment.

This means that if a firm can invest money/ resources only in one investment option then the firm will select that investment option which promises best return on investment to the firm.

In other words while doing so the firm gives up/rejects the next best option for investing the funds. The opportunity cost of a company is thus this income/ return which the firm could have earned on the next best investment alternative.

This can also be understood by a simple example. Let us assume that an individual has two job offers in hand. One job offer is promising him a salary of Rs. 40,000 per month while the other job offer will ensure salary of Rs. 35,000 per month.

If the job profile and other factors related to the job offers are more or less same then it can be easily expected that the individual will select the job offer which will provide him with higher salary that is salary of Rs. 50,000 per month. Thus, in this case the opportunity cost is the return involved in the next best alternative i.e., Salary of Rs. 35, 000 in the next best job offer.

Definition of Explicit Costs

Explicit Costs are the costs which involve an immediate outlay of cash from the business. The cost is incurred when any production process is going on, or activity is conducted in the normal course of business. The cost is a charge for the use of factors of production like land, labour, capital and so on. They are in the form of rent, salary, material, wages, and other expenses like electricity, stationery, postage, etc.

Explicit Costs show that payment has been made to outsiders, while business is carried on. The recognition and reporting of the explicit cost are very easy because they are recorded when they arise. They show that an amount has been spent over a business transaction. They can be calculated in terms of money.

Recording of the explicit cost is very important because it helps in the calculation of profit as well as it fulfills purposes like decision-making, cost control, reporting, etc.

Definition of Implicit Cost

Implicit Cost, also known as the economic cost, is the cost which the company had foregone while employing the alternative course of action. They do not involve any outflow of cash from the business. It is the value of sacrifice made by the entity at the time of exercising some other action.

The cost occurs when an asset is used as a factor of production by the entity instead of renting it out.

As they are not actually incurred they cannot be easily measured, but they can be estimated. They are not recorded in the books of accounts as well as these are not reported. The purpose of ascertaining the implicit cost is that it helps in decision making regarding the replacement of any asset and much more.

Implicit costs have a direct impact on the profitability and performance of the company. Some common examples of implicit costs are Interest on owner's capital, salary to the proprietor, etc. which are not actually incurred but they exist.

Accounting Costs: Measures the explicit costs of operating a business - Results From Purchases of Input Services.

Economic Profit: The difference between the total revenue and the cost of all inputs used by a firm over a given period. It is the TR - OC. OC are the explicit and implicit costs of the best alternative actions forgone (TR-TC).

2.2.3 Fixed costs, Variable Costs

A fixed cost is a cost which does not vary in the short term irrespective of changes in production or sales levels or other measures of activity. A fixed cost is a basic operating expense of a business that can't be avoided such as a rent payment. The concept is used in financial analysis to find the break even point of a business as well as to find product pricing.

To continue the example of a fixed cost, the rent on a building will not change until the lease runs out or is renegotiated irrespective of the level of business activity within that building. Examples of other fixed costs are insurance, depreciation and property taxes. It tend to be incurred on a regular basis and so are considered periodic costs. The amount charged to expense tends to change little from period to period.

When a company has a large fixed cost component it should generate a significant amount of sales volume in order to have sufficient contribution margin to offset the fixed cost. Once that sales level has been reached however this type of business generally has a relatively low variable cost per unit and so can generate out sized profits above the break even level.

An example of this situation is an oil refinery which has massive fixed costs related to its refining capability. If the cost of a barrel of oil drops below a certain amount the refinery loses money. However, the refinery can be wildly profitable if the price of oil increases beyond a certain amount.

Conversely, if a company has low fixed costs it probably has a high variable cost per unit. In this case a business can earn a profit at very low volume levels but does not earn out sized profits as sales increase. For example: A consulting business has few fixed costs while most of its labor costs are variable.

Fixed costs are allocated under the absorption basis of cost accounting. According to this arrangement fixed manufacturing overhead costs are proportionally assigned to the units produced in a reporting period and so are recorded as assets. Once the units are sold the costs are charged to the cost of goods sold. Thus, there can be a delay in the recognition of those fixed costs that are allocated to inventory.

Variable cost

It is a cost that varies in relation to changes in the volume of activity. The variable cost concept can be used to model the future financial performance of a business as well as to set minimum price points.

The most common variable costs are:

Direct materials, since the cost of materials are charged to expense when the associated products are sold.

Commissions, since the sales staff earns commissions when sales transactions are completed.

Billable labor, since wages associated with billable hours are charged to expense when the associated sales transactions are completed.

Piece rate labor, where employees are paid based on the number of units produced.

Credit card fees, where a fee is not incurred unless a customer uses a credit card to pay for a purchase.

Utility costs, which increase as production and/or employee headcount increase.

2.3 Total costs -Cost -Volume-Profit analysis - Determination of Break even point(simple problems) - Managerial significance and limitations of Breakeven point

Cost-Volume-Profit Analysis

Cost-Volume-Profit (CVP) analysis is a managerial accounting technique that is concerned with the effect of sales volume and product costs on operating profit of a business. It deals with how operating profit is affected by changes in variable costs, fixed costs, selling price per unit and the sales mix of two or more different products.

Assumptions in CVP Analysis: Simple CVP analysis relies on simplifying assumptions. However, if a manager knows that one of the assumptions is violated, the CVP analysis can often be easily modified to make it more realistic.

1. Selling price is constant. The assumption is that the selling price of a product will not change as the unit volume changes. This is not wholly realistic since unit sales and the selling price are usually inversely related. In order to increase volume it is often necessary to drop the price. However, CVP analysis can easily accommodate more realistic assumptions. A number of examples and problems in the text show how to use CVP analysis to investigate situations in which prices are changed.

2. Costs are linear and can be accurately divided into variable and fixed elements. It is assumed that the variable element is constant per unit and the fixed element is constant in total. This implies that operating conditions are stable. It also implies that the fixed costs are really fixed. When volume changes dramatically, this assumption becomes tenuous. Nevertheless, if the effects of a decision on fixed costs can be estimated, this can be explicitly taken into account in CVP analysis. A number of examples and problems in the text show how to use CVP analysis when fixed costs are affected.

3. The sales mix is constant in multi-product companies. This assumption is invoked so as to use the simple break-even and target profit formulas in multi-product companies. If unit contribution margins are fairly uniform across products, violations of this assumption will not be important. However, if unit contribution margins differ a great deal, then changes in the sales mix can have a big impact on the overall contribution margin ratio and hence on the results of CVP analysis. If a manager can predict how the sales mix will change, then a more refined CVP analysis can be performed in which the individual contribution margins of products are computed.

4. In manufacturing companies, inventories do not change. It is assumed that everything the company produces is sold in the same period. Violations of this assumption result in discrepancies between financial accounting net operating income and the profits calculated using the contribution approach. This topic is covered in detail in the chapter on variable costing.

Components of CVP analysis:

There are several different components that together make up CVP analysis. These components involve various calculations and ratios, which will be broken down in more detail in this guide.

The main components of CVP analysis are:

CM ratio and variable expense ratio

Break-even point (in units or dollars)

Margin of safety

Changes in net income

Degree of operating leverage

A. The Basics of Cost-Volume-Profit (CVP) Analysis

Cost-volume-profit (CVP) analysis is a key step in many decisions. CVP analysis involves specifying a model of the relations among the prices of products, the volume or level of activity, unit variable costs, total fixed costs, and the sales mix. This model is used to predict the impact on profits of changes in those parameters.

1. Contribution Margin: Contribution margin is the amount remaining from sales revenue after variable expenses have been deducted. It contributes towards covering fixed costs and then towards profit.

2. Unit Contribution Margin: The unit contribution margin can be used to predict changes in total contribution margin as a result of changes in the unit sales of a product. To do this, the unit contribution margin is simply multiplied by the change in unit sales. Assuming no change in fixed costs, the change in total contribution margin falls directly to the bottom line as a change in profits.

3. Contribution Margin Ratio: The contribution margin (CM) ratio is the ratio of the contribution margin to total sales. It shows how the contribution margin is affected by a given dollar change in total sales. The contribution margin ratio is often easier to work with than the unit contribution margin, particularly when a company has many products. This is because the contribution margin ratio is denominated in sales dollars, which is a convenient way to express activity in multi-product firms.

B. Some Applications of CVP Concepts: CVP analysis is typically used to estimate the impact on profits of changes in selling price, variable cost per unit, sales volume, and total fixed costs. CVP analysis can be used to estimate the effect on profit of a change in any one (or any combination) of these parameters. A variety of examples of applications of CVP are provided in the text.

C. CVP Relationships in Graphic Form: CVP graphs can be used to gain insight into the behavior of expenses and profits. The basic CVP graph is drawn with dollars on the vertical axis and unit sales on the horizontal axis. Total fixed expense is drawn first and then variable expense is added to the

fixed expense to draw the total expense line. Finally, the total revenue line is drawn. The total profit (or loss) is the vertical difference between the total revenue and total expense lines. The break-even occurs at the point where the total revenue and total expenses lines cross.

D. Break-Even Analysis and Target Profit Analysis: Target profit analysis is concerned with estimating the level of sales required to attain a specified target profit. Break-even analysis is a special case of target profit analysis in which the target profit is zero.

1. Basic CVP equations: Both the equation and contribution (formula) methods of break-even and target profit analysis are based on the contribution approach to the income statement. The format of this statement can be expressed in equation form as:

Profits = Sales - Variable expenses - Fixed expenses

In CVP analysis this equation is commonly rearranged and expressed as:

Sales = Variable expenses + Fixed expenses + Profits

a. The above equation can be expressed in terms of unit sales as follows:

$$\text{Price} \times \text{Unit sales} = \text{Unit variable cost} \times \text{Unit sales} + \text{Fixed expenses} + \text{Profits}$$
$$\Downarrow$$
$$\text{Unit contribution margin} \times \text{Unit sales} = \text{Fixed expenses} + \text{Profits}$$
$$\Downarrow$$
$$\text{Unit sales} = \frac{\text{Fixed expenses} + \text{Profits}}{\text{Unit contribution margin}}$$

b. The basic equation can also be expressed in terms of sales dollars using the variable expense ratio:

$$\text{Sales} = \text{Variable expense ratio} \times \text{Sales} + \text{Fixed expenses} + \text{Profits}$$
$$\Downarrow$$
$$(1 - \text{Variable expense ratio}) \times \text{Sales} = \text{Fixed expenses} + \text{Profits}$$
$$\Downarrow$$
$$\text{Contribution margin ratio}^{*} \times \text{Sales} = \text{Fixed expenses} + \text{Profits}$$
$$\Downarrow$$
$$\text{Sales} = \frac{\text{Fixed expenses} + \text{Profits}}{\text{Contribution margin ratio}}$$

$$^{*}\ 1 - \text{Variable expense ratio} = 1 - \frac{\text{Variable expenses}}{\text{Sales}} = \frac{\text{Sales} - \text{Variable expenses}}{\text{Sales}} = \frac{\text{Contribution margin}}{\text{Sales}} = \text{Contribution margin ratio}$$

2.3.1 Determination of Break even point(simple problems)

Break-even point using the equation method. The break-even point is the level of sales at which profit is zero. It can also be defined as the point where total sales equals total expenses or as the point where total contribution margin equals total fixed expenses. Break-even analysis can be approached either by the equation method or by the contribution margin method. The two methods are logically equivalent.

a. The Equation Method—Solving for the Break-Even Unit Sales. This method involves following the steps.

The above equation can be expressed in terms of unit sales as follows:

Price x Unit sales = Unit variable cost x Unit sales + Fixed expenses + Profits

Unit contribution margin x Unit sales = Fixed expenses + Profits

$$\text{Unit sales} = \frac{\text{Fixed expenses} + \text{Profits}}{\text{Unit contribution margin}}$$

Substitute the selling price, unit variable cost and fixed expense in the first equation and set profits equal to zero. Then solve for the unit sales.

b. The Equation Method—Solving for the Break-Even Sales in Dollars. This method involves following.

The basic equation can also be expressed in terms of sales dollars using the variable expense ratio:

Sales = Variable expense ratio x Sales + Fixed expenses + Profits

(1 - Variable expense ratio) x Sales = Fixed expenses + Profits

Contribution margin ratio* x Sales = Fixed expenses + Profits

$$\text{Sales} = \frac{\text{Fixed expenses} + \text{Profits}}{\text{Contribution margin ratio}}$$

$$1 - \text{Variable expense ratio} = 1 - \frac{\text{Variable expenses}}{\text{Sales}}$$

$$= \frac{\text{Sales} - \text{Variable expenses}}{\text{Sales}}$$

= Contribution margin/Sales

= Contribution margin ratio

Substitute the variable expense ratio and fixed expenses in the first equation and set profits equal to zero. Then solve for the sales.

3. Break-even point using the contribution method. This is a short-cut method that jumps directly to the solution, bypassing the intermediate algebraic steps.

A. The Contribution Method—Solving for the Break-Even Unit Sales. This method involves using the final formula for unit sales in section (1a) above. Set profits equal to zero in the formula.

$$\text{Break-even unit sales} = \frac{\text{Fixed expenses} + \$0}{\text{Unit contribution margin}} = \frac{\text{Fixed expenses}}{\text{Unit contribution margin}}$$

b. The Contribution Method—Solving for the Break-Even Sales in Dollars. This method involves using the final formula for sales in section (1b) above. Set profits equal to zero in the formula.

$$\text{Break-even sales} = \frac{\text{Fixed expenses} + \$0}{\text{Contribution margin ratio}} = \frac{\text{Fixed expenses}}{\text{Contribution margin ratio}}$$

4. Target profit analysis: Either the equation method or the contribution margin method can be used to find the number of units that must be sold to attain a target profit. In the case of the contribution margin method, the formulas are:

Unit sales to attain target profits = $\frac{\text{Fixed expenses} + \text{Target profits}}{\text{Unit contribution margin}}$

Dollar sales to attain target profits = $\frac{\text{Fixed expenses} + \text{Target profits}}{\text{Contribution margin ratio}}$

Note that these formulas are the same as the break-even formulas if the target profit is zero.

Break Even Analysis Assumptions

• All costs are classified as either fixed or variable. If not impossible or impractical, dividing costs into the variable and fixed cost elements as an extremely difficult job. This is attributable to the inherent nature or characteristics of the cost perse.

• Fixed costs remain constant within the relevant range. Fixed costs remain unchanged at any level of activity within the relevant range even at the zero level.

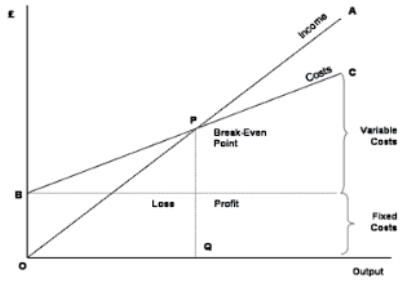
• The behavior of total revenues and total costs will be linear over the relevant range i.e., will appear as a straight line on the break even chart. This is based on the idea that variable costs vary in direct proportion to volume. The fixed costs remain unchanged hence drawn as a straight horizontal line on the graph within the relevant range and that selling price is constant.

• In case of multiple product companies the selling prices, costs and proportion of units sold will not change. This cannot always be correct. Sales mix ratio may be due to the change in the consuming habits of customers. Selling prices of the individual products may likewise change due to competition, popularity and salability of the products, etc.

• There is no significant change in the inventory levels during the period under review. Stated in another way production volume is assumed to be almost equal to the sales volume which causes an immaterial difference between the beginning and ending inventories.

The Break-Even Chart

In its simplest form the break even chart is a graphical representation of costs at different levels of activity shown on the same chart as the variation of income (or sales revenue) with the same variation in activity. The point at which neither profit nor loss is made is known as the break even point and is represented on the chart below by the intersection of the two lines,



In the diagram above the line OA represents the variation of income at varying levels of production activity (output). OB represents the total fixed costs in the business. As output increases variable costs are incurred meaning that total costs (fixed + variable) also increase. At low levels of output costs are greater than income. At the point of intersection P, costs are exactly equal to income and hence neither profit nor loss is made.

Problems

1. From the following data, calculate number of units that must be sold to earn a profit of Rs. 90,000.

	₹
Fixed Factory Overheads Cost	60,000
Fixed Selling Overheads Cost	12,000
Variable Manufacturing Cost per unit	12
Variable Selling Cost per unit	3
Selling Price per unit	24

Solution:

(i) ***Break–even point*** $= \dfrac{\text{Fixed Cost}}{\text{Selling Price per unit} - \text{Variable Cost per unit}}$

Variable Cost per unit = ₹ 12 + 3 = ₹ 15

Total Fixed Cost = ₹ 60,000 + 12,000 = ₹ 72,000

B.E.P. $= \dfrac{72,000}{24-15} = 8,000$ units

B.E.P. (in sales values) = 8,000 × 24 = ₹ 1,92,000

(ii) ***Number of units that must be sold to earn profit of ₹90,000***

$$= \frac{\text{Fixed Cost} + \text{Profit}}{\text{Selling Price per unit} - \text{Variable Cost per unit}}$$

$$= \frac{72,000 + 90,000}{24-15} = \frac{1,62,000}{9} = 18,000 \text{ units.}$$

2. From the following data, you are required to calculate break-even point and net sales value at this point:

	₹
Direct material cost per unit	10
Direct labour cost per unit	5
Fixed overhead	50,000
Variable overheads @ 60% on direct labour	
Selling price per unit	25
Trade discount	4%

If sales are 10% and 25% above the break even volume, determine the net profits.

Solution:

Break - even Point (in sales value) $= \frac{\text{Fixed Cost}}{\text{P/V Ratio}}$

$$\text{P/V Ratio} = \frac{\text{Contribution}}{\text{Sales}} \times 100$$

$$= \frac{6}{24} \times 100 = 25\%$$

$$\text{Hence, B.E.P. (in sales value)} = \frac{50,000}{25\%} = 50,000 \times \frac{100}{25}$$

$= ₹\ 2,00,000$

Profit when sales are 10% above the break even volume

Sales = 2,00,000 + 10% of 2,00,000 = ₹ 2,20,000

Contribution = Sales × P/V Ratio = 2,20,000 × 25/100 = ₹ 55, 000

Contribution = Fixed Cost + Profit

₹ 55,000 = 50,000 + Profit

Profit = **₹ 5,000**

Profit when sales are 25% above the break even volume

Sales = 2,00,000 + 25% of 2,00,000 = ₹ 2,50,000

Contribution = 2,50,000 × 25/100 = ₹ 62,500,

Contribution = Fixed Cost + Profit

62,500 = 50,000 + Profit

Profit = **₹ 12,500**

3. From the following information, ascertain by how much the value of sales must be increased by

	₹
Sales	3,00,000
Fixed Cost	1,50,000
Variable Cost	2,00,000

the company to break-even:

Solution:

$$\text{Break–even point} = \frac{\text{Fixed Cost} \times \text{Sales}}{\text{Sales} - \text{Variable Cost}}$$

$$= \frac{1,50,000 \times 3,00,000}{3,00,000 - 2,00,000}$$

$$= \frac{1,50,000 \times 3,00,000}{1,00,000} = \text{Rs. } 4,50,000.$$

Hence, Sales to be increased by the company to break-even are = ₹ 4,50,000 – 3,00,000 = ₹ 1,50,000.

4. Pepsi Company produces a single article. Following cost data is given about its product:-

Selling price per unit Rs.40

Marginal cost per unit Rs.24

Fixed cost per annum Rs. 16000

Calculate:

(a)P/V ratio

(b) break even sales

(c) sales to earn a profit of Rs. 2,000

(d) Profit at sales of Rs. 60,000

(e) New break even sales, if price is reduced by 10%.

Solution:

We know that (S-v) /S= F + P OR s x P/V Ratio = Contribution

So,

(A) P/V Ratio = Contribution/sales x 100

= (40-24)/40 x 100 = 16/40 x 100 OR 40%

(B) Break even sales

S x P/V Ratio = Fixed Cost

(At break even sales, contribution is equal to fixed cost)

Putting this values: s x 40/100 = 16,000

S = 16,000 x 100 / 40 = 40,000 OR 1000 units

(C) The sales to earn a profit of Rs. 2,000

S x P/V Ratio = F + P

Putting this values: s x 40/100 = 16000 + 2000

S = 18,000 x 100/40

S = Rs. 45,000OR 1125 units

(D)Profit at sales of 60,000

S x P/V Ratio = F + P

Putting this values: Rs. 60,000 x 40/100 = 16000 + P

24,000 = 16000 + P

24,000 – 16,000 = P

8,000

(E) New break even sales, if sale price is reduced by10%

New sales price = 40-10% = 40-4 = 36

Marginal cost = Rs. 24

Contribution = Rs. 12

P/V Ratio = Contribution/Sales

= 12/36 x100 OR 33.33%

Now, s x P/V Ratio = F (at B.E.P. contribution is equal to fixed cost)

S x 100/300 = Rs.16000

S = 16000 x 300/100

S= Rs.48,000.

5. From the following information's find out:

a. P/V Ratio

b. Sales &

c. Margin of Safety

Fixed Cost = Rs.40, 000

Profit = Rs. 20,000

B.E.P. = Rs. 80,000

Solution:

a. P/V Ratio.

We know that S – V = F + P OR S(S – V)/S = F + P

B.E.S. x P/V Ratio = F (Value of P is zero at BE Sales) OR P/V Ratio = F/BES

Putting the value,

P/V Ratio = 40,000/80,000 = 50/100 OR 50%

b. Sales.

We know that Sales x P/V Ratio = F+ P OR Sales x P/V Ratio = Contribution

OR Sales = Contribution/P/V Ratio

So, = (40,000 + 20,000)/50/100

= (60,000 x 100)/50

=Rs.1, 20,000

c. Margin of Safety.

Margin of Safety = Sales – B.E.P Sales

So, MOS = 1, 20,000 – 80,000

MOS = Rs.40, 000

2.3.2 Managerial significance and limitations of Breakeven point

Utility of the break-even analysis can be realized only when it is interpreted wisely and used carefully because the analysis is found on several unrealistic assumptions. In view of these limitations this technique of financial analysis suffers from the following weaknesses.

Break-even analysis is a short run analysis of cost-volume relationships which will change in correspondence with variation in costs of material and labour and the introduction of new methods of production or with the installation of new equipment.

In view of this, such analysis may not prove very useful to rapidly growing companies and to companies which frequently change their product mix or methods of production and whose material and labour costs change very widely.

The break-even analysis is not suited to deal with cost profit-output relationships in respect of multi-products. A separate break-even analysis for each product has to be used. Then there is also a problem of allocation of expenses which are common to a number of products. In that case it may be an impossible task even to determine the marginal cost.

Another weakness of the break-even analysis is that it does not take due cognizance of factors like uncertainty and risk involved in estimates of costs, volume and profits. As a matter of fact, this analysis is based on historical relationships of cost-profits and output. These relationships may not remain the same over a long period of time.

For extreme volume changes, there may be no historical precedence. Furthermore, it should not be forgotten that the break-even analysis is used to determine profits level for future and not for the past. Past relationships of cost, volume and profits may not necessarily hold good in future.

Finally, the break-even analysis may not prove as a potent tool for long range planning as in short-term planning. The analysis may not justify incurring those expenditures whose benefits are not realized during the period encompassed by most break-even analyses although these expenditures may be necessary to the continued life of the firm.

Managerial uses of Break Even Analysis

To the management the utility of break even analysis lies in the fact that it presents a microscopic picture of the profit structure of a business enterprise. The break even analysis not only highlights the area of economic strength and weakness in the firm but also sharpens the focus on certain leverages which can be operated upon to enhance its profitability. It guides the management to take effective decision in the context of changes in government policies of taxation and subsidies.

The break even analysis can be used for the following purposes,

(i) Safety margin

The break even chart supports the management to know at a glance the profits generated at the various levels of sales. The safety margin refers to the extent to which the firm can afford a decline before it starts incurring losses. The formula to determine the sales safety margin is,

Safety Margin = (Sales – BEP)/ Sales x 100

From the numerical example at the level of 250 units of output and sales the firm is earning profit the safety margin can be found out by applying the formula.

Safety Margin = 250- 150 / 250 x 100 =40%

This means that the firm which is now selling 250 units of the product can afford to decline sales upto 40 per cent. The margin of safety may be negative as well if the firm is incurring any loss. In that case the percentage tells the extent of sales that should be increased in order to reach the point where there will be no loss.

(ii) Target Profit

The break even analysis can be utilized for the purpose of calculating the volume of sales necessary to achieve a target profit. When a firm has some target profit this analysis will help in finding out the extent of increase in sales by using the following formula.

Target Sales Volume = (Fixed Cost + Target Profit) / Contribution Margin per unit

By way of illustration, Suppose the firm fixes the profit as Rs.100 then the volume of output and sales should be 250 units. Only at this level it gets a profit of Rs. 100. By using the formula the same result will be obtained.

(iii) Change In Price

The management is often faced with a problem of whether to decrease prices or not. Before taking a decision on this question the management will have to consider a profit. A reduction in price leads to a reduction in the contribution margin.

This means that the volume of sales will have to be increased even to maintain the existing levels of profit. The higher the reduction in the contribution margin the higher is the increase in sales required to ensure the previous profit.

Limitations of Break-Even Analysis:

1. Break-even analysis is based on the assumption that all costs and expenses can be clearly separated into fixed and variable components. In practice, however, it may not be possible to achieve a clear-cut division of costs into fixed and variable types.

2. It assumes that fixed costs remain constant at all levels of activity. It should be noted that fixed costs tend to vary beyond a certain level of activity.

3. It assumes that variable costs vary proportionately with the volume of output. In practice, they move, no doubt, in sympathy with volume of output, but not necessarily in direct proportions..

4. The assumption that selling price remains unchanged gives a straight revenue line which may not be true. Selling price of a product depends upon certain factors like market demand and supply, competition etc., so it, too, hardly remains constant.

5. The assumption that only one product is produced or that product mix will remain unchanged is difficult to find in practice.

6. Apportionment of fixed cost over a variety of products poses a problem.

7. It assumes that the business conditions may not change which is not true.

8. It assumes that production and sales quantities are equal and there will be no change in opening and closing stock of finished product, these do not hold good in practice.

9. The break-even analysis does not take into consideration the amount of capital employed in the business. In fact, capital employed is an important determinant of the profitability of a concern.

3

INTRODUCTION TO MARKETS, THEORIES OF THE FIRM & PRICING POLICIES

Market Structures: Perfect Competition, Monopoly, Monopolistic competition and Oligopoly - Features - Price and Output Determination - Managerial Theories of firm: Marris and Williamson's models - other Methods of Pricing: Average cost pricing, Limit Pricing, Market Skimming Pricing, Internet Pricing: (Flat Rate Pricing, Usage sensitive pricing) and Priority Pricing.

3.1 Market Structures: Perfect Competition, Monopoly, Monopolistic competition and Oligopoly - Monopolistic Competition

Economists in general recognize 4 major types of market structures (plus a larger number of subtypes) that are as follows,

- Perfect Competition
- Monopoly
- Oligopoly
- Monopolistic competition

Perfect Competition

Perfect Competition is a term where “p” stands for perfect, pure or price, whichever we may like.

A p-competitive structure is defined by four characteristics. For an industry to have a p competitive structure, it should have all 4 of these characteristics, which are as follows,

- Many buyers and sellers
- A homogeneous product
- Sufficient knowledge
- Free entry

These all are characteristics that favor price competition.

Many Buyers and Sellers

The idea is that the sellers and buyers are small relative to the size of the market, so that no one of them can "fix the price". If there are "many small sellers", it creates it much harder for any seller or group of sellers to "rig the price". Similarly, if there are "many small buyers", there is little opportunity for buyers to "rig the price" in their own favor.

Homogeneity

If the product (or service) of one seller varied significantly from that of another seller, then each seller would probably be able to retain at least some of the customers, even at a very high price. These would be the customers who just prefer this seller's product (or service) to that of someone else. The assumption of homogeneous products serves to rule that out.

Knowledge

Some versions of the "perfectly competitive" structure include "perfect knowledge" as one of its characteristics. But, "perfect knowledge" never exists in reality. Perfect information is little less clear than the other assumptions we can hardly assume that people know everything there need to know.

Free Entry

Free entry means that new companies can set up in business to compete with established companies whenever the new competitors feel that the profits are high enough to justify the investment. This is the first and foremost, a legal condition. That is, in a "perfectly competitive" market, there are no government restrictions on the entry of new competition.

Let us sum up the four characteristics of p-competition:

1. Many small sellers

The more the sellers, the more substitutes the consumer has.

2. Homogeneous products

When the product is homogeneous, then the substitutes are "perfect substitutes".

3. Sufficient knowledge

When customers know the prices offered by other sellers, they will be better able to switch, increasing elasticity further.

4. Free entry

In the long run, companies may even enter the market to provide still more substitutes.

Other Market Forms

The other three market structure models can be defined in terms of the ways in which they deviate from the characteristics of p-competition. In a “monopoly”, there is just one seller of a good or service for which there is no close substitute.

In an “oligopoly”, there are two or more, but only a few firms. In “monopolistic competition”, the products are not homogeneous but are "differentiated”. We do not have a standard model for "insufficient knowledge", but at least in some cases, that seems to work similarly to "product differentiation.”

Monopoly is a market structure in which there is only one producer/seller for a product. In other words the single business is the industry. Entry into such a market is restricted due to high costs or other impediments, which might be economic, social or political.

For instance, a government can create a monopoly over an industry that it needs to control such as electricity. Another reason for the barriers against entry into a monopolistic industry is that oftentimes, one entity has the exclusive rights to a natural resource.

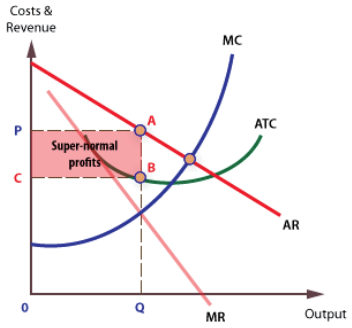
For example, in Saudi Arabia the government has sole control over the oil industry. A monopoly might also form when a company has a copyright or patent that prevents others from entering the market. Pfizer for instance had a patent on Viagra.

In an oligopoly, there are only a few firms that make up an industry. This select group of firms has control over the price and like a monopoly, an oligopoly has high barriers to entry. The products that the oligopolistic firms produce are often nearly identical and therefore, the companies, which are competing for market share, are interdependent as a result of market forces.

Let us assume an example that an economy needs only 100 widgets. Company X produces 50 widgets and its competitor, Company Y produces the other 50. The prices of the 2 brands will be interdependent and, therefore same. So, if company X starts selling the widgets at a lower price it will get a greater market share thereby forcing company Y to lower its prices as well.

Key characteristics:

Monopolies can maintain super-normal profits in the long run. As with all firms profits are maximized when MC = MR. Generally the level of profit depends upon the degree of competition in the market which for a pure monopoly is zero. At profit maximisation MC = MR and output is Q and price P. Given that price (AR) is above ATC, at Q, supernormal profits are possible (area PABC).



With no close substitutes, the monopolist can derive super-normal profits area PABC. A monopolist with no substitutes would be able to derive the greatest monopoly power.

The advantages of monopolies:

Monopolies can be defended on the following grounds,

• Domestic monopolies can become dominant in their own territory and then penetrate overseas markets earning a country valuable export revenues. This is certainly the case with Microsoft.

• They can benefit from economies of scale and may be 'natural' monopolies so it might be argued that it is best for them to remain monopolies to avoid the wasteful duplication of infrastructure that would happen if new firms were encouraged to build their own infrastructure.

• It has been consistently argued by some economists that monopoly power is needed to generate dynamic efficiency that is technological progressiveness.

According to Austrian economist, Joseph Schumpeter inefficient firms including monopolies would eventually be replaced by more efficient and effective firms through a process called creative destruction.

The disadvantages of monopoly to the consumer:

Monopolies can be criticised because of their potential negative effects on the consumer including,

• Restricting output onto the market.

• Charging a higher price than in a more competitive market.

• Reducing consumer surplus and economic welfare.

• Restricting choice for consumers.

• Reducing consumer sovereignty.

Oligopoly

In oligopolistic markets, independent suppliers (few in numbers and not necessarily acting in collusion) can effectively control the supply and thus the price, thereby creating a seller's market.

They offers largely similar products, differentiated mainly by heavy advertising and promotional expenditure and can anticipate the effect of one another's marketing strategies. Examples include airline, automotive, banking and petroleum markets.

In an oligopoly, there are only a few firms that make up an industry. This select group of firms has control over the price and like a monopoly, an oligopoly has high barriers to entry. The products that the oligopolistic firms produce are often nearly identical and therefore, the companies which are competing for market share, are interdependent as a result of market forces.

Let us assume, for example, that an economy requires only 100 widgets. Company X produces 50 widgets and its competitor, Company Y, produces the other 50. The prices of the 2 brands will be interdependent and therefore, similar. So, if Company X starts selling the widgets at a lower price, it will get a greater market share, thereby forcing Company Y to lower its prices as well.

3.1.1 Monopolistic Competition

Monopolistic competition is a market structure in which several sell products that are similar but not identical.

Characteristics of monopolistic competition

1. Many sellers =) Firms compete.

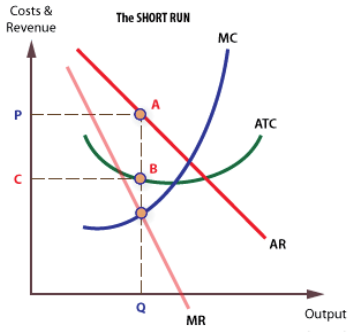
2. Product Differentiation =) Each MR faces downward sloping demand curve.

3. Free Entry =) Economic are zero.

Examples of monopolistic competition: CDs, Books, movies, computer software, restaurants, furniture and so on.

Monopolistic competition in the short run:

At profit maximisation MC = MR and output is Q and price P. Given that price (AR) is above ATC at Q, supernormal profits are possible (area PABC).

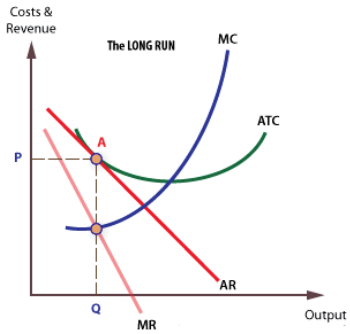


Monopolistic competition in the short run

As new firms enter into the market, demand for the existing firm's products becomes more elastic and the demand curve shifts to the left driving down price. Eventually all super-normal profits are eroded away.

Monopolistic competition in the long run:

Super-normal profits attract in new entrants which shifts the demand curve for existing firm to the left. New entrants continue until only normal profit is available. At this point firms have reached their long run equilibrium.



Monopolistic competition in the long run

The advantages of monopolistic competition:

Monopolistic competition can bring the following advantages,

• Differentiation creates diversity, choice and utility.

For example a typical high street in any town will have a number of different restaurants from which to choose.

• There are no significant barriers to entry therefore markets are relatively contestable.

• The market is more efficient than monopoly but less efficient than perfect competition - less allocative and less productively efficient. However they may be dynamically efficient, innovative in terms of new production processes or new products.

For example retailers often constantly have to develop new ways to attract and retain local custom.

The disadvantages of monopolistic competition:

There are many potential disadvantages associated with monopolistic competition namely,

Some differentiation does not create utility but generates unnecessary waste such as excess packaging. Advertising might also be considered wasteful though most is informative rather than persuasive.

As the above diagram illustrates assuming profit maximization there is allocated inefficiency in both the long and short run. This is because price is above marginal cost in both cases. In the long run the firm is less allocative inefficient but it is still inefficient.

3.2 Features - Price and Output Determination - Managerial Theories of firm: Marris and Williamson's models - Other Methods of Pricing: Average cost pricing, Limit Pricing, Market Skimming Pricing

The main characteristic or features of monopolistic competition are as follows,

1. Differentiation in products

Under monopolistic competition, the firms sell differentiated products. Product differentiation might be real or imaginary. Real differentiation is done through differences in the materials used, design, color etc,. Imaginary differences might be created through advertisement, brand name, trade marks etc,.

The firms producing same products in this imperfectly competitive world cannot raise the price of product much higher than their rivals. If they do so, they will lose much of their sale, but not all the sale.

In case, they lower the price, the total sale can be increased to a certain extent. How much will the sale increase or decrease by lowering or raising the price will depend upon the product differentiation of the different firms.

If the product of the different firms are very close substitutes of one another and no imaginary or real difference exists in the mind of the buyers, then a slight rise or fall in the price of the product of one firm will appreciably decrease or increase the demand for the product.

If the product of one firm differs from that of other firm, (though the difference might be an imaginary one) a slight rise in the price of the product of one firm will not drive away all its customers. A few faithless buyers might be attracted by the low price of the other rival product but not all the buyers.

2. A fairly large number of sellers

The number of firms in monopolistic competition is fairly large. Every firm produces or sells a close substitute for the product of other firms in the product group or industry. Product differentiation is thus the hallmark of monopolistic competition.

3. Nature of demand curve

Since the existence of close substitutes limits the monopoly power, the demand curve faced by a monopolistically competitive firm is fairly elastic. The precise degree of elasticity will however, depend upon the number of firms in the group product or industry.

If the number of firms is fairly large and the product of each firm is not very similar, the demand curve of a firm will be quite elastic. In case, there is close competition among the rival firms for the sale of same products, the demand curve of a firm will be less elastic.

4. Advertisement and propaganda

Another very important characteristic of the monopolistic competition is that each firm tries to create difference in its product from the other by propaganda, advertising, attractive packing, nice smile, etc.,

When it succeeds in its object, the firm occupies almost the position of a monopolist. Thus, it is in a position to raise - the price of the product without losing its customers.

5. Sales efforts

With heterogeneous products, the sale of the products by the firms can no longer be taken for granted, sale depends upon sale efforts.

6. Non-price competition

In monopolistic competition, the firms create every effort to win over the customers. Other than price cutting, the firms might offer after sale service, a gift scheme, discount not declared in the price list etc,.

7. Freedom of entry and exit of firms

The entry of new firms in the monopolistically competitive industry is relatively easy. There are no barriers of the new firm to enter the product group or leave the industry in the long run.

3.2.1 Managerial Theories of firm: Marris and Williamson's models

The managerial theories of the firm are the economic theories of how the behaviour of modern management affects the working of the economic system. These theories have been the subject of considerable research in business and management literature.

Managerial theories of the firm themselves fall into three broad categories, discretionary theories, in which it is assumed that managers, without direct stake in the firm and free from strict supervision by the owners, will take decisions based mainly on price and cost.

Growth oriented theories, which start from the same basis but assume the long - term objective of managers is the growth of the enterprise and bureaucratic theories, which assume that the owners of the firm also control it and seek strategies which reduce risk.

These managerial theories stand in opposition to neo - classical theories of the firm, which imply that management - managed firms are directed in the sole interests of their shareholders.

Maris and Williamson's models

Williamson has developed managerial-utility-maximization theory as against profit maximization. It is also called as the 'managerial discretion theory'. In large modern firms, shareholders and managers are two separate groups. The shareholders want the maximum return on their investment and hence the maximization of profits.

The managers, on the other hand, have consideration other than profit maximization in their utility functions. Thus the managers are interested not only in their own emoluments but also in the size of their staff and expenditure on them.

Thus Williamson's theory is related to the maximization of the manager's utility which is a function of the expenditure on staff and emoluments and discretionary funds. "To the extent that pressure from the capital market and competition in the product market is imperfect, the manager, therefore, has discretion to pursue goals other than profits".

The managers derive utility from a wide range of variables. For this Williamson introduces the concept of expense preferences. It means "that managers get satisfaction from using some of the firm's potential profits for unnecessary spending on items from which they personally benefit".

To pursue his objective of utility maximization, the manager directs the firm's resources in three ways,

1. The manager has the goal to expand his staff and to increase their salaries. "More staff is valued because they lead to the manager getting more salary, more prestige and more security". Such staff expenditures by managers are denoted by S.

2. To maximize his utility, the manager indulges in “featherbedding” such as pretty secretaries, company cars, too many company phones, ‘perks’ for employees, etc. Such expenditures are characterized as ‘management slack’, M by Williamson.

3. The manager likes to set up “discretionary funds” for making investments to advance or promote company projects that are close to his heart. Discretionary profits or investments D are what remains with the manager after paying taxes and dividends to shareholders in order to retain an effective control of the firm.

Thus, the manager’s utility function is given as,

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

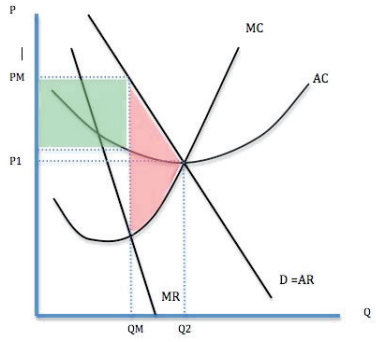
where, U is the utility function, S is the staff expenditure, M is the management slack and D the discretionary investments. These decision variables (S, M, D) yield positive utility and the firm will always choose their values subject to the constraint, $S \geq 0 \geq M_0$, $D \geq 0$.

Williamson assumes that the law of diminishing marginal utility applies so that when additions are made to each of S, M and D, they yield smaller increments of utility to the manager.

Further, Williamson regards price (P) as a function of output (X), expenditure on staff (S) and the state of environment which he calls ‘a demand shift parameter’ (E), so that $P = f(X, S, E)$.

3.2.2 Other Methods of Pricing: Average cost pricing, Limit Pricing, Market Skimming Pricing

Average cost pricing



The average cost pricing rule is a pricing strategy that regulators impose on certain businesses to limit what they are able to charge consumers for its products or services to a price equal to the costs necessary to create the product or service. This implies that businesses will set the unit price of a product relatively close to the average cost needed to produce it.

BREAKING DOWN 'Average Cost Pricing Rule'

This pricing method is often imposed on natural, or legal, monopolies. Certain industries (such as power plants) benefit from monopolization, since large economies of scale can be achieved.

However, allowing monopolies to be unregulated can produce economically harmful effects, such as price fixing. Since regulators usually allows the monopoly to charge a small price increase amount above of cost, average cost pricing looks to remedy this situation by allowing the monopoly to operate and earn a normal profit.

Average-cost pricing practices have been widely supported by empirical studies, and the pricing practice is adopted by a large number of small and large companies in most industries.

Utilizing an average-cost pricing strategy, a producer charges, for each product or service unit sold, only the addition to total cost resulting from materials and direct labor. Businesses will often set prices close to marginal cost if sales are suffering. If, for example, an item has a marginal cost of $1 and a normal selling price is $2, the firm selling the item might wish to lower the price to $1.10, if demand has waned. The business would choose this approach because the incremental profit of 10 cents from the transaction is better than no sale at all.

Average-cost pricing is well used as the basis for a regulatory policy for public utilities (especially those that are natural monopolies) in which the price received by a firm is set equal to the average total cost of production. The great thing about average-cost pricing is that a regulated public utility is guaranteed a normal profit, usually termed a fair rate of return. One bad thing about average-

cost pricing is that marginal cost is less than average total cost meaning that price is greater than marginal cost.

Penetration pricing:

It is the use of lower than normal prices to increase market share. Penetration pricing is also used to establish a new product in a market which is expected to have a long - life and potential for growth.

Destructive pricing:

It involves decreasing the price of an existing product or selling a new product at an artificially low price in order to destroy competitor's sales.

Mixed pricing:

It is a policy which initially uses skim pricing and then, as competition increases, price cutting, sometimes even below cost, to penetrate the market, increases market share and eliminate competition.

Absorption pricing:

It involves the use of lower than normal prices either to launch a new product or periodically boost the sales of existing products.

Differential discrimination pricing:

It is the use of different prices for the same product when it is sold in various locations or market segments. Whilst small buyers or those located in remote areas may charge a higher price to cover the additional distribution costs.

Marginal cost pricing:

It is something used when a firm has some spare capacity which it wishes to use without diverting away from its regular business.

Essentially a firm incurs fixed costs such as rent, whether or not it is operating at full capacity.

Negotiable pricing:

Its is common in industrial markets. The pricing is individually calculated to take accounts of cost, demand and any specific customer requirement.

Limit pricing:

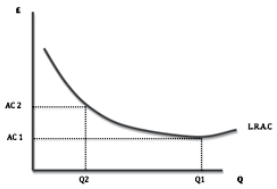
The act of setting prices low in an attempt to eliminate the competition. Predatory pricing is illegal under anti-trust laws, as it makes markets more vulnerable to a monopoly. Companies might

engage in a variety of activities that intend to drive out competitors, such as create barriers to entry for new competitors or unethical production methods to minimize costs.

Limit Pricing is a pricing strategy, a monopolist may use to discourage entry. If a monopolist set its profit maximizing price (where MR = MC) the level of supernormal profit would attract new firms into the market.

Therefore, the monopolist might decide to set a price below this profit maximizing level, but still enable it to make higher profits than in a competitive market. For limit pricing to be effective, the monopolist needs to increase output up to the level where a new firm will not be able to make any profit on entering the market. The monopolist may also build excess capacity as a threat that if firms enter, it will reduce the price even further.

Economies of Scale



Economies of Scale

A new firm might sell only Q2 and face higher average costs than the incumbent. This means that if the monopoly keeps price lower than profit maximization it can also discourage new firms entering.

Skimming Pricing

Skimming pricing is called as charging high price in initial stages. This can be followed by a firm by charging skimming price for a new product in pioneering stage. When demand is either unknown or more inelastic at this stage, market is splitted into segments on the basis of different degree of elasticity of demand of different consumers.

This is a short period device for pricing. The demand for new products is likely to be less price elastic in the early stages, that is, the initial high price helps to “Skim the Cream” of the market which is relatively insensitive to price.

This policy is shown in the below figure, where the manufacturer of new product initially determines OP price and sells OQ quantity. Thus, he receives KPMN abnormal profit. Under this policy, consumers are distinguished by the producers on the basis of their intensity of desire for a commodity.

For example, in the beginning the prices of TVs, computers, electronic calculators, etc., were very high but now they are declining every year. A high initial price together with heavy promotional expenditure might be used to launch a new product if conditions are appropriate.

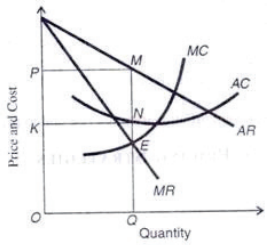


Fig. 1

Skimming price curve

These conditions are listed below as,

(i) Demand is likely to be less price elastic in the early stages than later. The cross elasticity demand should be very low.

(ii) When the demand elasticity is unknown, high introductory price serves as a refusal price during the stage of exploration.

(iii) Launching a new product with a high price is an efficient device for breaking the market into segments that differ in price elasticity of demand.

(iv) High initial prices supports to finance the flotation of the product. In the early stages, the cost of production and organization of distribution are high. In addition, research and promotional investments have to be made.

Price and Cost Relationship

For evolving a price policy for any product, price and cost relationship is the basic consideration. Cost conditions determine price. Therefore, cost estimates must be correctly made. Although a firm should recover its common costs, it is not necessary that prices of each product be high enough to cover an arbitrarily apportioned share of common costs.

Proper pricing does require, however, that prices at least cover the incremental cost of producing each good. Incremental costs are additional costs that would not be incurred if the product were not produced. As long as the price of a product exceeds its incremental costs, the firm can rise total profit by supplying that product.

Hence decisions must be based on an evaluation of incremental costs. A price that offers maximum contribution over costs is generally acceptable but in multi-product cases, incremental cost becomes more essential to make such decisions.

A set of alternative price policies should be considered and they are,

(i) Prices of multi-products might be proportional to full cost. This price might produce equal percentage of profit margin for all products. If the full cost for all products are assumed equal then the pricing will be equal.

(ii) Pricing for multi-products might be proportional to incremental cost.

(iii) Prices of multi-products might be assessed with reference to their contribution margin as proportional to conversion cost.

(iv) Prices of multi-product might be fixed differently keeping into consideration market segments.

(v) Prices for multi-products may be fixed as per the product life cycle of each product.

3.3 Internet Pricing: (Flat Rate Pricing, Usage sensitive pricing) and Priority Pricing

The Internet has provided impetus for today's business and many business and pricing models have been designed. Assessing the value of the pricing mechanisms in the Internet is complicated owing to its nature: It is abstract and its value depends on its context, speed, accessibility, reliability and the like.

Flat Rate Pricing

Flat rate pricing for its wireless data service. It provides unlimited wireless data transfer for a variety of applications including wireless e-mail, remote LAN and corporate Intranet access for mobile computing customers. The aggressive new plans ultimately simplify the wireless data pricing and allow AT & T customers to better anticipate monthly usage costs.

The two new plans include,

• Local Unlimited, a monthly rate of Rs. 54.99, it carries an additional Rs. 0.20 per kilobyte roaming fee when users are outside of markets where AT&T operates wireless IP service.

• National Unlimited, a monthly rate of Rs. 64.99 with roaming charges extra.

Wireless IP rates (also known as CDPD or Cellular Digital Packet Data) have historically used variable charges for each kilobyte of data the customer transmits over the network. The reason for implementing this is to introduce the "Digital One Rate" service. The new plans are designed for customers who use an IP compatible modem with their laptop, hand-held computer, PDA or a specialized portable device.

The Local Unlimited plan will appeal to customers who use their wireless applications mainly in their local AT&T wireless IP markets, whereas the National Unlimited plan is designed for frequent travelers who need wireless access to information from various locations across the country. Both

these plans would benefit customers who on average send and receive at least one MB of information by wireless a month or whose usage levels vary monthly.

However for other aspect relating to quality of services like monitoring traffic, transmission, congestion and the like are not provided. Flat Rate Pricing, according to AT&T, will gives the user the ability to accurately budget for communication and media needs.

Since remote access to data is becoming an increasingly vital tool for mobile professionals, AT&T's new data pricing plan will permit the user to utilize their investment in wireless technology without worrying about access costs.

Usage - based Pricing

Users pay one portion of their bill for a connection charge and another portion for the bits received or sent. The marginal monetary cost of sending or receiving another bit is non-zero for part of the time.

This is a case where there are two components present that is a charge for getting connected and subsequently marginal charges for using the services, precisely when bit / bytes are received or sent.

This mechanism falls into the category of two-component pricing. However as McKnight & Bailey (1995) pointed out, it is possible, for example to have usage - based pricing during peak hours and flat rate pricing during off - peak hours.

Transaction - based Pricing

In a transaction-based model, the cost-to-customer is based on the number of transactions executed. The model enables the customer to release management bandwidth and buy capacity as and when needed without incurring regular costs. The service provider is able to spread the investment cost by utilizing the delivery platform across multiple clients that need the same kind of service. This results in decreased per transaction costs and better economies of scale.

Highlights

Total cost of ownership by delivering more work for same cost.

Flexible team ramp up.

Business continuity with reduced ramp up-time.

Lean core team supported by strategic bench.

Quantitative management by effective KPIs.

While transaction-based pricing can provide significant benefits to both customers and service providers, there are also a few challenges:

Complexity - designing a transaction-based pricing model is complex and requires a good understanding of these transactions and their cost structure by both customers and service providers.

Predicting Volumes - predicting a reasonable level of accuracy, providing a minimum volume commitment for economies-of-scale and planning for volume variations is a complicated exercise that only a few customers are able to perform in a systematic and consistent manner.

Lack of Availability of Benchmarking Data - lack of availability of reliable external benchmarks, in addition to unreliable internal benchmarks, can hamper the customer's ability to ascertain the commercial competitiveness of a service provider's quotes.

Loss of Control - since day-to-day resource decisions and productivity information are not apparent to the customer, there is the perception that transaction-based pricing leads to loss of control.

Organization Change - transaction-based pricing leads to changes in quite a few areas like budgeting (tracking inconsistent monthly / quarterly service cost), corporate finance (ensuring that invoices reflect accurate charges and credits), functional departments (affecting business process change) and all departments (inculcating demand forecasting practices).

Priority pricing

Gupta, Stahl, and Whinston (1997) present a priority pricing approach.

When a user requests delivery of a service, he specifies one of several priority classes for the job. The optimal congestion toll depends on the traffic at the site [of possible congestion], the priority class and the social cost of time (delay time) a user imposes on others. Since the user has some expectations about congestion tolls and costs of the delay (for example, based on econometrical estimations), he will request the service within a chosen priority class, if his expected benefits exceed these expected costs.

If he values the service less, he waits for a less congested time, thus reallocating the load on the network better over time. Expected time of the delay and the traffic through congested link instantaneously change, as well as user's expectations. Since the user accounts for the delay when making expectations about the price, he pays a marginal social cost, thereby internalizing the congestion externality.

The static priority pricing model proposed by Cocchi, Shenker, Estrin, and Zhang (1993) deals with "maximizing time-averaged user benefits". The 24 pricing is independent of the congestion costs imposed on others and seeks to reallocate network resources in favor of higher-valued jobs in times of congestion.

To determine the value of each job, jobs are assigned to specific service classes (quite similar to priority classes discussed above). The authors present a simulation model by which they demonstrate that it is possible to derive optimal priority prices. This significantly increases benefits over single priority pricing.

Pricing objectives refer to the general and specific objectives which a firm sets for itself in establishing the price of its products and/or services and these are not much different from the marketing objectives of a firm or its overall business objectives. Generally, the objectives of pricing are as follows,

(a) To maximize profits

(b) To increase sales

(c) To increase the market share

(d) To satisfy customers

(e) To meet the competition

(f) To generate internal resources to finance expansion and growth

(g) To maximize the value of the firm for different stakeholders.

Pricing Policy

Pricing policies are intended to bring consistency in the pricing pattern. They define how to handle complex issues such as price discrimination and price stability. Pricing policies play a significant role, not only in the case of single product firms but also multi-product firms. A multi-product firm faces more challenges such as maintaining price differentials be-tween related products, especially substitutes such as deluxe models and basic models.

Pricing Methods

The following are the different methods of pricing.

1. Cost-based Pricing Methods

(a) Cost-plus pricing: This is also called 'full-cost or mark-up' pricing. Here the average cost at normal capacity of output is ascertained and a conventional margin of profit is added to the cost to arrive at the price. In other words, find out a product's unit total cost and add a percentage of profit to arrive at the selling price.

This method is suitable where costs keep fluctuating. It is commonly followed in departmental stores and other retail shops. This method is simple to be administered but it does not consider the competition factor. A competitor may produce the same product at a lower cost and thus, offer it at a lower price.

Sometimes, it may be very difficult to find the selling price in advance due to the complexity of the nature of the project. In such a case, the parties to the contract agree on a percentage of profit on the total cost incurred to execute the project.

For instance, in the case of large capital projects or high technology contracts, time, duration of construction or changing technical specifications leads to a high degree of uncertainty about the final price. In such a case, the only alternative is to adopt cost plus pricing.

(b) Marginal cost pricing: In marginal cost pricing, selling price is fixed in such a way that it covers fully the variable or marginal cost and contributes towards the recovery of fixed costs fully or partly, depending upon the market situation. In times of stiff competition, marginal cost offers a guideline as to how far the selling price can be lowered.

(c) Social cost based pricing: Charging Based on Social Cost is a system of charging extra for the users of a transport network during peak hours to reduce traffic congestion. The highway users are charged relatively higher toll charges during the peak hours, higher charges for utilities during peak hours, public transport in canals and airports.

The purpose of this charging to regulate the demand during peak hours so that the congestion is managed without increasing supply. This method gains importance because traffic has to be managed in the light of the supply constraint.

When the users are made aware of the higher toll charges payable during the peak hours and the consequences of such excessive use on the environment, the use comes down relatively. This method is also called congestion pricing.

Since this method involves payment of differential tariff, it is criticised by many that it is not equitable and is burdensome for the users. Even the shopkeepers complain that their business activity is affected adversely.

II. Competition oriented Pricing

Here, pricing is a very complex task. Here, the price of a product is decided on the basis of what the competitor charges for a similar product. In other words, a reduction in the price of products by the competitor will force a particular seller to follow suit. But how much can this seller reduce the price? Here the marginal cost concept comes handy.

As long as the price covers the marginal cost, he will continue to sell. If not, he will stop selling. It is because every unit sold at less than the marginal cost results in a loss apart from fixed expenses losses.

(a) Sealed bid pricing: This method is more popular in tenders and contracts. Each contracting firm quotes its price in a sealed cover called 'tender'. All the tenders are opened on a scheduled date and the person, who quotes the lowest price, other things remaining the same, is awarded the contract.

The objective of the bidding firm is to bag the contract and hence, quote lower than others. The comment of marginal cost is the guiding principle here also. Any price quoted less than the marginal price results in a loss apart from fixed expenses. Ambitious quoting, no doubt, results in profit but suffers from the danger of losing the contract.

(b) Going rate pricing: Here the price charged by the firm is in tune with the price charged in the industry as a whole. In other words, the prevailing market price at a given point of time is the guiding factor.

When one wants to buy or sell gold, the prevailing market rate at a given point of time is taken as the basis to determine the price. Normally, the market leaders keep announcing the prevailing prices at a given point of time based on demand and supply positions.

(c) Limit Pricing: A limit price is the price set by a monopolist with a view to discourage others from entering into a market. The limit price is often lower than the average cost of production or just low enough to make entering not profitable. With limit price in operation, those entering the market with a view to compete with the monopolist will find it totally unattractive to survive.

The firms use different strategies to keep competition off. Some of such strategies include signing a union contract to employ a certain (high) level of labor for a long period of time or building excess production capacity so as to drive out competition effortlessly. It is illegal in many countries.

Pricing Strategies in Times of Stiff Price Competition

We find firms selling similar products in a neck and neck contest. If the price wars lead to prices close to marginal cost, the firms do not really get any profit. In such a situation, there are five strategies that are valuable for firms,

1. Price matching: Price matching is a strategy in which a firm promises to match a lower price offered by any competitor while announcing its own price. It is necessary that the firm is confident, that the price cannot be less than the one is has offered before adopting this strategy.

If all the firms maintain the same price, they share the market and charge monopoly price which results in high profits. The firm that comes out with a similar product at a lower price, will reclaim back its market share.

2. Promoting brand loyalty: This is an advertising strategy where customers are frequently reminded of the brand value of a given product or service. The conviction here is that customers, once loyal to a given product or service, will not slip away when competitors come out with products at lower prices. Pepsi and Coke spend huge amounts on advertising campaigns to draw the attention of consumers. Brand loyal customers continue to be with the firm despite its higher prices.

3. Time-to-time pricing: In this method, the firm varies its price from time to time, could be hour to hour or day to day.

This method offers two advantages: The rival firms cannot play with price cuts. Customers will have no experience of which firm charges the lowest price. There is no guarantee that one firm continues to offer the best price. The person who has the price information often stands to gain. But this gain is short lived or is a one time benefit.

This is because such information needs to be updated from time to time. A customer cannot hunt for price information every time. So all the firms in the market have their own undisturbed market share. Added to this, they can also sustain their market share by providing better customer care and service.

This method is frequently applied in bullion, currency and bank deposit markets. Gold prices vary internationally for various extraneous considerations. Banks keep changing their deposit interest rates. Similarly, the exchange rate of the US dollar varies from time to time. Different exchange houses vary their buying and selling rates of different currencies.

4. Promotional pricing: A firm may offer a product at the most competitive price to promote it. Sometimes, the price of a particular product is kept intentionally low to attract the attention of a customer to the other products of the firm. The objective is to increase the sales of the entire product line rather than make a profit on a particular product.

5. Target pricing: Here, the company operates with a particular targeted profit in mind. Normally the cost of capital will be one of the yardsticks to guide the targeted rate of return. How much is the rate of return the other companies achieve could also be a yardstick to determine the price. The higher the risk and investment, the higher is the targeted profits and price.

III. Demand-oriented Pricing

The higher the demand, the higher may be the price. Cost is not the consideration here. The key to pricing here is the value as perceived by a consumer. This is a relatively modern marketing concept.

Most organization now consider favourably such proposals where there is a possibility to charge higher prices on their products and services, even though they call for higher investments and latest technology.

Demand oriented pricing can take two forms,

(a) Differential pricing, also called price discrimination.

(b) Perceived value pricing.

(i) Price discrimination: Price discrimination refers to the practice of charging different prices to customers for the same good. A firm uses its discretion to charge different customers differently. It is also called differential pricing.

Customers of different profiles can be separated in various ways, such as on the basis of consumer requirements (for example, bulk and low gas supply to industrial and household consumers), the nature of the product itself (for example original and replacement components of pressure cookers), geographical areas (domestic and international markets), income group (patients, in a government hospital, are charged a fee based on their income groups) and so on.

The objectives of price discrimination are to,

(a) Develop a new market including, for exports

(b) Utilize the maximum capacity

(c) Share consumer surplus along with the consumer and not leave it totally to him

(d) Meet competition

(e) Increase the market share

(ii) Perceived value pricing: Perceived value pricing refers to fixing the price on the basis of a buyer's perception of the value of the product.This involves more understanding the needs and psychology of the customer.

(iii) Priority pricing: Priority pricing is more visible in securities trading. In securities trading, the first bid or offer price is executed before the next bid or offer price. The sequence of receipt of bids is the basis for execution of the transactions. Volume of the order is not important here. As per the market rules in stock trading, the first trade received to be executed first.

Of course, if two bids are received at the same time, one for the large volume is given preference over the other and execute. The rationale behind priority pricing is that the user pays for what he gets. The charges payable under priority pricing are fixed more on what the customer is ready to pay for the services rendered.

III. Strategy based Pricing

(a) Market skimming: When a product is introduced for the first time in the market, the company fixes a very high price for it. The main idea is to charge the customer the maximum possible. This strategy is mostly found in the case of technology products.

When Sony introduces a particular TV model, it fixes a very high price. A new series of Pentium is priced very high when it is released into the market. Initially everyone cannot afford to buy it. But with time, the price comes down and more people can afford to the product.

This method can be followed only when,

(i) the demand for the product is inelastic

(ii) there is no threat from competition

(iii) high price is coupled with high technology or quality

(b) Market penetration: This is exactly reverse of the market skimming method. The price of the product is fixed so low that a company can increase its market share. The company attains profits with increasing volumes and increase in the market share.

More often, companies believe that it is necessary to dominate the market in the long run than making profits in the short run. This method is more suitable where the market is highly price sensitive.

In such a case, a low price stimulates rapid growth. It will be more appropriate in cases where the costs are likely to fall with an increase in output. A low price may not attract a significant degree of competition either.

Through penetration pricing policy, the firms succeed in launching its new products and services and thus penetrating the mass markets through lower price offers, particularly while introducing new products.

This method of pricing is also called stay out pricing because it discourages the new concerns from entering the market. Penetration pricing yields good results when (a) the product or service has elastic demand (b) produced in mass (c) there is threat of competition.

(c) Two part pricing: Firms with market power can enhance their profits by the two part pricing strategy. Under this strategy, a firm charges a fixed fee for the right to purchase its goods, plus a per unit charge for each unit purchased.

Entertainment houses such as Country Club, athletic clubs, golf courses and health clubs usually adopt this strategy. They charge a fixed initiation fee plus a monthly or a per visit charge, to use the facilities. There are also organizations which charge a membership fee (equivalent to the consumer surplus) and offer their products and services on a cost to cost basis.

The fixed fee generally equals the consumer surplus each consumer receives at this per unit price. The monthly basis equals the marginal cost. Under this method, if the membership consumer surplus, actual profits can even be higher than in the case of monopoly.

(d) Block pricing: Block pricing is another way a firm with market power can enhance its profits. We see block pricing in our day-to-day life. Six Lux soaps in a single pack or five Maggie noodles packets in a single pack illustrate this pricing method.

By selling a certain number of units of a product as one package, a firm earns more than by selling unit wise. Block pricing is a profit maximization price on each package. It is generally the total value a consumer receives for the package, including consumer surplus.

It works out as follows,

Suppose six International Lux soaps are offered as a single unit along with a nice looking soap box at Rs. 100. Here, a consumer has to make an all-or-none decision between buying six units or buying nothing.

From the customer point of view, each soap bar costs, say, Rs 18 and the soap box is priced at Rs 25. So the soaps and box together cost the customer (6 ' 18) + 25 = 108 + 25 = Rs 133. As against

this, the pack of six International Lux soaps is offered at Rs. 100 which is fairly attractive from the customer's angle.

The consumer surplus here is equal to its 33. Block pricing enhances profits by forcing consumers to make an all or none decision to purchase a product. This can enhance profits even in situations where consumers have identical demands for a given product.

(e) Commodity bundling: Commodity bundling refers to the practice of bundling two or more different products together and selling them at a single 'bundle price'. The package deals offered by tourist companies and airlines hold testimony to this practice. The package includes the airfare, hotel, meals, sight seeing and so on at a bundled price instead of pricing each of these services separately.

Computer Firms offer PCs, assembling as per the customer specifications and of PCs and offer them at a bundled price. The car companies provide cars with air-conditioning, power steering, automatic transmission, auto-gear so on and sell them at a special price. Commodity bundling is a viable pricing strategy to enhance profits when consumers differ with respect to the amounts they are willing to pay for multiple products sold by a firm.

It is advantageous for a trader to know how much a consumer is prepared to pay for each of the product offered in a bundle. In case a tourist is prepared to a any price for viewing Niagara Falls for longer hours, the tourist company can charge better more to this customer by letting him have a good time.

(f) Transfer pricing: Transfer pricing is an internal pricing technique. It refers to a price at which inputs of one department are transferred to another in order to maximize the overall profits of the company.

In case of a company having multiple processes, the output of one process is the input of the next. Till production reaches the last stage, the output of each process is termed as work in progress.

The output price of one process affects the output price of next. The engine department of Kinetic Honda makes scooter engines and forwards these to the assembly department. The assembly department in turn assembles the scooter.

Here, the price at which the engine department forwards each engine affects the price of the scooter. Transfer pricing refers to the method of pricing the work-in-progress at different levels of processing at which one department forwards its output to the next department for further processing.

(g) Precedence Model: The Precedence model is more seen in the context of internet users. During peak hours, when congestion is likely to occur, precedence model offers a solution in terms of offering the services in a sequence.

It does not support any new real time multimedia applications. It provides a framework where in the existing users who compete for resource sharing are given better service in a conflict free environment.

First, a criteria set to determine the priority of different applications (precedence numbers are assigned accordingly) and this be reflected in the internet protocol (IP) precedence field of the different data packets.

The packets would receive network priority based on their precedence numbers. During times of congestion, this model provides a logical basis for deciding which packets to send first and which to hold up or drop.

(h) Transaction Based Pricing (TBP): This is technology based pricing (TBP) model that allows to acquire enterprise wide case management solution including all the services require in terms of support, maintenance, version upgrades and training at one go.

Normally all these means a large capital expenditure. But when these are associated with the main transaction, the charges for all these services could be factored into the price of the main transaction. Today organizations have several constraints in terms of budget availability and skill-set. Transaction based pricing is viewed as the best alternative in such a case.

Annual maintenance contract for a refrigerator or an air conditioner will be cheaper if taken up at the time of purchase of the asset. Transaction costs are kept lower to attract the customers. This allows for immediate profits for the customers also.

Unlimited support and new version upgrades offer more attraction for the customers to prefer transaction based pricing and this is equally profitable for the sellers/service providers also.

Smart Pricing (Through Smart Market Mechanism Model): Smart pricing is one of the latest methods of pricing which adds more value for the users. As part of smart pricing, automatic price adjustments are introduced for certain clicks obtained from the Google Network.

Google's smart pricing model offers better placement for better performing ads and reduced the cost of a click to the least amount possible to stay above the competitor's ad. And now, with no change in the bid, Google may reduce the cost for a click that better reflects the value it brings to advertisers.

Google Ad Words Team, for instance, introduced two improvements to Ad words that will help improve our ROT and help you reach additional targeted prospects. First, the price of certain clicks is adjusted based on expected value to help ensure better performance for advertisers. Second, the reach of contextually-targeted advertising is extended to ads in approved email programs, including G mail and HTML newsletters.

The Google Network constantly analyses the data across its network and if its data shows that a click is less likely to turn into business results (e.g.online sale, registration, phone call, newsletter

sign up), it may reduce the price payable for that click. One can may notice a reduction in the cost of clicks from content sites.

Many factors are considered in this process such as what keywords or concepts triggered the ad, as well as the type of site where the ad was served. For example, a click on an ad for medical tourism on a web page about do's and don'ts in medical tourism may be worth less than a click on the same ad appearing next to a review of hospitals offering services of medical tourism.

In this process, one can save time and hassle by estimating the value of clicks and adjusting prices on an ongoing basis. With improved smart pricing, one automatically gets greater value for clicks from ad impressions across the network, all with no change in how bids are made.

4

TYPES OF BUSINESS ORGANIZATION AND BUSINESS CYCLES

Features and Evaluation of Sole Trader, Partnership, Joint Stock Company - State/Public Enterprises and their forms - Business Cycles : Meaning and Features - Phases of a Business Cycle.

4.1 Features and Evaluation of Sole Trader, Partnership

There are three main forms of business organizations in the economy today, they are sole proprietorship, the partnership and the corporation. Each offers its owners significant advantages and disadvantages.

The most common form of business organization in the United States is the sole proprietorship or proprietorship - a business owned and run by one person.

Although relatively the most numerous and profitable of all business organizations, proprietorships are the smallest in size.

Proprietorships earn almost one - fifth of the net income earned by all businesses, even though they make only a fraction of total sales.

Sole Proprietorships

The sole proprietorship is the easiest form of business to start because it involves almost no requirements except for occasional business licenses and fees.

The advantages of a sole proprietorship includes,

- Relative ease of management.
- Ease of starting up.
- No separate business income taxes.
- Owner enjoys the profits of successful management.
- Ease of getting out of business.
- Psychological satisfaction.

The disadvantages of a sole proprietorship are as follows,

- Full and personal responsibility for all losses and debts of the business.
- Owner has unlimited liability.
- Size and efficiency.
- Difficulty in raising financial capital.
- Limited managerial experience.
- The business may have to carry a large inventory or stock of finished goods and parts in reserve.
- Difficulty of attracting qualified employees.
- Firm ceases to exist when owner dies, quits or sells the business.
- Limited life.

Partnerships

A partnership is a business jointly owned by 2 or more persons.

Partnerships are the least numerous form of business organization, accounting for the smallest proportion of sales and net income.

Types of Partnerships

The most common form of partnership is a general partnership, one in which all partners are responsible for the management and financial obligations of the business.

In a limited partnership, at least one partner is not active in the daily running of the business, although he or she may have contributed funds to finance the operation. Because more than 1 owner is involved, formal legal papers called articles of partnership are usually drawn up to specify arrangements between partners.

The advantages of a partnership includes,

- Ease of management.
- Ease of establishment.
- Attract financial capital easily.
- Lack of special taxes.
- Easier to attract top talent.
- Slightly larger size, increased efficiency.

The disadvantages of a partnership includes,

- Limited partners have limited liability.
- Each partner is fully responsible for the acts of all other partners.
- Potential for conflict between partners.
- Offer increased access to financial capital, but do not always work out.
- Limited life.

A business might have to file for bankruptcy, a court-granted permission to an individual or business to cease or delay debt payments.

Corporation

A Corporation is a business organization that has a separate legal personality from its owners. Ownership in a stock corporation is represented by shares of stock.

The owners (stockholders) enjoy limited liability but have limited involvement in the company's operations. The board of directors, an elected group from the stockholders, controls the activities of the corporation. In addition to those basic forms of business ownership, these are some other types of organizations that are common today.

Limited Liability Company

Limited liability companies (LLC's) in the USA, are hybrid forms of business that have characteristics of both a corporation and a partnership. An LLC is not incorporated. Hence, it is not considered a corporation.

Nonetheless, the owners enjoy limited liability like in a corporation. An LLC may elect to be taxed as a sole proprietorship, a partnership or a corporation.

Co - operative

A Co-operative may be a business organization owned by a group of individuals and is operated

for their mutual benefit. The persons creating up the group are called members. Co-operatives might be incorporated or unincorporated.

Some examples of co-operatives are water and electricity(utility) cooperatives, cooperative banking, credit unions and housing cooperatives.

Types of partnership:

The different kinds of Partners that are found in Partnership Firms are as follows,

1. Active or managing partner:

A person who takes active interest in the conduct and management of the business of the firm is called as active or managing partner.

He carries on business on behalf of the other partners. If he wish to retire, he has to give a public notice of his retirement, otherwise he will continue to be liable for the acts of the firm.

2. Nominal or ostensible partner:

A nominal partner is one who does not have any real interest in the business but lends his name to the firm, without any capital contributions and doesn't share the profits of the business. He also does not usually have a voice in the management of the business of the firm, but he is liable to outsiders as an actual partner.

3. Sleeping or dormant partner:

A sleeping partner is a partner who 'sleeps', that is he does not take active part in the management of the business. Such a partner only contributes to the share capital of the firm, is bound by the activities of other partners and shares the profits and losses of the business.

A sleeping partner, unlike an active partner, is not needed to give a public notice of his retirement. As such, he will not be liable to third parties for the acts done after his retirement.

Sleeping vs Nominal Partners:

It might be clarified that a nominal partner is not the same as a sleeping partner. A sleeping partner contributes capital shares profits and losses, but is not known to the outsiders.

A nominal partner, on the contrary is admitted with the purpose of taking advantage of his name or reputation. As such, he is known to the outsiders, although he does not share the profits of the firm nor does he take part in its management. Nonetheless, both are liable to third parties for the acts of the firm.

4. Partner by estoppel or holding out :

If a person, by his words or conduct holds out to another that he is a partner, he will be stopped from denying that he is not a partner. The person who thus becomes liable to third parties to pay the debts of the firm is known as a holding out partner.

There are two essential conditions for the principle of holding out,

(a) The person to be held out should have made the representation, by words written or spoken or by conduct, that he was a partner.

(b) The other party should prove that he had knowledge of the representation and acted on it, for instance, gave the credit.

5. Partner in profits only :

When a partner agrees with the others that he would only share the profits of the firm and would not be liable for its losses, he is in own as partner in profits only.

6. Minor as a partner :

A partnership is created by an agreement. And if a partner is incapable of entering into a contract, he cannot become a partner. Thus, at the time of creation of a firm a minor cannot be one of the parties to the contract.

But under section 30 of the Indian Partnership Act, 1932, a minor 'can be admitted to the benefits of partnership', with the consent of all partners. A minor partner is entitled to his share of profits and to have access to the accounts of the firm for use of inspection and copy.

He, however can't file a suit against the partners of the firm for his share of profit and property as long as he remains with the firm. His liability in the firm will be limited to the extent of his share in the firm and his private property cannot be attached by creditors.

On his attaining majority, he has to decide within 6 months whether he will become regular partner of withdraw from partnership. The choice in either case is to be intimated through a public notice, failing which he will be treated to have decided to continue as partner and he becomes personally liable like other partners for all the debts and obligations of the firm from the date of his admission to its benefits. He also becomes entitled to file a suit against other partners for his share of profit and property.

7. Other partners:

In partnership firms, many other types of partners are also found, namely, secret partner who does not want to disclose his relationship with the firm to the general public. Outgoing partner, who retires voluntarily without causing dissolution of the firm, limited partner who is liable only up to the value of his capital contributions in the firm.

However, the moment public comes to know of it he becomes liable to them for meeting debts of the firm. Usually, an outgoing partner is liable for all debts and obligations as are incurred before his retirement. A limited partner is found in limited partnership only and not in general partnership.

4.2 Joint Stock Company - State/Public Enterprises and their forms - State/Public Enterprises and their forms

A company which has some features of a corporation and some features of a partnership. The company sells fully transferable stock, but all shareholders have unlimited liability.

Characteristics and features of a joint stock company

Perpetual succession

Perpetual succession means continuous existence. A company is creation of the law and only law can bring it to an end. It is life independent on the life of its members. The death, insolvency or lunacy of a member does not affect the life of the company. It continues to exist even if all its members dies. Members may come and go but the company goes on till it is wound up.

Separate legal existence

A company has a distinct and separate legal entity, independent of its members. It means that the company can own property, make contracts and file suits in it own name. Shareholders are not the joint owners of the company's property.

A shareholder cannot be held liable for the acts of the company. A creditor of the company is not the creditor of its members. This is one of the important characteristics of joint stock companies that has made it very popular form of business.

Limited liability

As a separate legal entity, its members cannot be held liable for the debts of the company. The liability of every member is limited to nominal value of the shares bought by him or the amount of the guarantee given by him.

For instance, if a member has 50 shares of Rs. 10 each, liability is limited to Rs. 500 only. Even if the assets of the company are found to be insufficient to satisfy the claims of the creditors, no member can be called to pay anything more than what is due to him.

Common seal

Being an artificial entity, a company cannot act and sign itself. Therefore, it acts through human beings. All the acts of the company are authorized through its common seal. The common seal is affixed on all important documents as a token of the company's approval.

The common seal is an official signature of the company. This common seal is valid only if signed by at least two members of the Board of Directors.

Without these features of joint stock companies, it would have been better to call it a firm rather than a company form of organization.

Transferability of shares

The capital of a company is divided into parts each part called a share. These share are generally transferable. A shareholder is free to withdraw his membership from the company by transferring his shares.

Advantages of joint stock company

1. Limited liability:

Usually the liability of members of a company is limited to the extent of uncalled or unpaid

shares held by them. Their personal property can't be seized to meet the company's liability beyond the above mentioned liability.

2. Large capital:

A company can gather huge capital for the business through shares and debentures, public deposits, loans etc,. Due to huge capital the company can conduct business on a large scale.

3. Continuity and stability:

Death, insolvency or insanity of any member of the company will not affect its life and existence. Men may come and they might go but a company remains forever. It can be wound up under the provision of the act.

4. Economies of scale:

A company operates on a high scale and so it enjoys economies in production, distribution, management and financing.

5. Professional management:

The Company appoints experienced, competent and expert to manage the business. Their services lead to managerial and administrative efficiency and accuracy.

6. Bargaining power:

Compared to other forms of organization, a joint stock company is a strong power in buying as well as in selling of goods because of its large scale production.

7. Large membership:

The Company is owned by a large number of members maximum of 50 in case of private limited company and unlimited number of member in the case of public limited company.

8. Legal status:

Since the company is created by law, it has separate legal existence compared to its members. Therefore, the members can't be personally held responsible for the acts of company and company cannot be held liable for the acts of the members.

9. Employment:

Joint Stock Company gives employment to a large number of people directly and indirectly. This leads to higher national income for the country and higher living standard of living for the people.

10. Transferability of shares:

Shares of Joint Stock Company, especially public companies, are freely transferable. A member who wants to sell his shares can easily do so in the stock market. This encourages the public and other to invest in shares.

11. Research and development:

Joint Stock Companies undertakes R&D continuously thus bringing about new and improved products which benefits people.

12. Government revenue:

Joint Stock Companies provide revenue to the government in the form of taxes charged directly and indirectly.

13. Economic development:

Because of Joint Stock Companies there is all round development of trade, commerce and industry. The society in general gains the benefit of the industrial development. Large capital, government revenue, economic development etc., are the advantages of Joint Stock Companies.

Disadvantages of Joint Stock Company

(i) Lacks flexibility:

The working of a Joint Stock Company is less flexible is compared to other organizations. For very small thing they either have to follow a detailed procedure or obtain sanctions from different authorities. This results in lack of flexibility.

(ii) Difficult formation:

Formation of Joint Stock Company is an expensive and time consuming process as a number of

legal formalities have to be undertaken in order to register the company.

(iii) Excessive government regulation:

The Company is a subject to excessive government control. It has to follow the numerous provision of the companies act. This makes working difficult.

(iv) No business secrecy:

This form of organization lacks business secrecy because it is compulsory for the company to publish accounts and other records.

(v) Delay in decision:

The Joint Stock Company is completely not free to take all decisions and to implement the decisions. Due to excessive government control and democratic set up all decisions are taken in meetings and some decisions need shareholder's approval. All this leads to delay in decisions.

(vi) Lack of contact with customer:

A company cannot be in a position to maintain intimate contacts with customers. It cannot enter the requirements of each and every customer. Then there is no close personal touch which decreases the competitive strength of the business due to large scale operation.

(vii) Conflict of interest:

Many persons can be the owners of Joint Stock Company. There can be misunderstanding and jealousy among them and these cause problems in operation of business and profit making.

(viii) Lack of contact with employees:

The top management may not have contact with their employees. This might cause friction and disputes among the management and the employees which may affect the worker's and employee's morale.

(ix) Exploitation of shareholders:

Sometimes the BOD might misappropriate the fund and mislead the shareholders by window

dress report. The directors may even manipulate the trading on the stock exchange. Thus shareholders can be exploited by corrupt directors.

(x) Not suitable for all type of business:

This type of organization is not suitable for business where personalized services are required.

(xi) Cooperative organization:

Cooperative organization owned by and operated for the benefit of those using its services. Cooperatives have been successful in a number of fields, including the processing and marketing of farm products, the purchasing of other kinds of equipment and raw materials and in the wholesaling, retailing, electric power, credit and banking and housing industries. The income from a retail cooperative is usually returned to the consumers in the form of dividends based on the amounts purchased over a given period of time.

Modern consumer cooperatives, usually called co-ops in the United States, are thought to have begun in Great Britain in 1844, with the Rochdale Equitable Pioneers Society The society created a set of organizational and working rules that have been widely adopted. They included open membership, democratic control, no religious or political discrimination, sales at prevailing market prices and the setting aside of some earnings for education.

The co-operative movement developed rapidly in the latter part of the 19th century, particularly in the industrial and mining areas of northern England and Scotland. It spread quickly among the urban working class in Britain, France, Germany and Sweden and among the rural population of Norway, the Netherlands, Denmark and Finland.

In the United States, attempts at consumer and agricultural marketing cooperatives were made at the beginning of the 19th century. Although most U.S. cooperatives developed in rural areas, consumer and housing cooperatives spread substantially in metropolitan areas in the late 20th century.

Co-operatives were introduced in Latin America by European immigrants in the early 1900s. Later they were often fostered by state action in connection with agrarian reform. Marketing and credit cooperatives have been important in many African nations, especially since World War II.

During the Soviet era, marketing cooperatives of the U.S.S.R. and eastern Europe functioned as part of a centrally controlled purchasing network for farm produce. Co-operative farms in those countries were modeled on the Russian artel, in which all land was pooled and worked in common and income was distributed according to work performed.

(xii) 'State-Owned Enterprise - SOE'

A legal entity that is created by the government in order to partake in commercial activities on the government's behalf. A state owned enterprise (SOE) can be either wholly or partially owned by a government and is typically earmarked to participate in commercial activities.

Also known as government-owned corporations (GOC), state owned entities should not be confused with companies with stocks that are owned in part by a government body, since these companies are truly public corporations which happen to have a government entity as one of their shareholders.

SOEs are common across the globe, including in the U.S where mortgage companies Freddie Mac and Fannie Mae are considered government-sponsored enterprises (GSE's).

4.2.1 State/ Public Enterprises and their forms

Public sector firms are organized differently for purposes of management and control. They are departmental undertakings, statutory corporations, central boards and companies.

Meaning of Public Enterprises

The business units owned, managed and controlled by the central, state or local government are termed as public sector enterprises or public enterprises. These are also known as public sector undertakings. A pubic sector enterprise may be defined as any commercial or industrial undertaking owned and managed by the government with a view to maximize social welfare and uphold the public interest.

Public enterprises consist of nationalized private sector enterprises such as banks, Life Insurance Corporation of India and the new enterprises set up by the government such as Hindustan Machine Tools (HMT), Gas Authority of India (GAIL), State Trading Corporation (STC) etc.

Characteristics Of Public Enterprises

Looking at the nature of the public enterprises their basic characteristics can be summarized as follows,

(a) Government Ownership and Management: The public enterprises are owned and managed by the central or state government or by the local authority. The government may either wholly own the public enterprises or the ownership may partly be with the government and partly with the private industrialists and the public. In any case the control, management and ownership remains primarily with the government.

For example,

(a) National Thermal Power Corporation (NTPC) is an industrial organization established by the Central Government and part of its share capital is provided by the public. So is the case with Oil and Natural Gas Corporation Ltd (ONGC).

(b) Financed from Government Funds: The public enterprises get their capital from Government Funds and the government has to make provision for their capital in its budget.

(c) Public Welfare: Public enterprises are not guided by profit motive. Their major focus is on providing the service or commodity at reasonable prices. Take the case of Indian Oil Corporation or Gas Authority of India Limited (GAIL). They provide petroleum and gas at subsidized prices to the public.

(d) Public Utility Services: Public sector enterprises concentrate on providing public utility services like transport, electricity, telecommunication etc.

(e) Public Accountability: Public enterprises are governed by public policies formulated by the government and are accountable to the legislature.

(f) Excessive Formalities: The government rules and regulations force the public enterprises to observe excessive formalities in their operations. This makes the task of management very sensitive and cumbersome.

Forms of Organization of Public Enterprises

There are three different forms of organization used for the public sector enterprises in India. These are,

(1) Departmental Undertaking

(2) Statutory (or Public)Corporation

(3) Government Company

Departmental Undertaking form of organization is primarily used for provision of essential services such as railways, postal services, broadcasting etc. It is a traditional form of operating and managing affairs of public enterprise. They are organized, financed and controlled by the certain department of the government. Budget is prepared every year.

Such organization function under the overall control of a ministry of the Government and are financed and controlled in the same way as any other government department. This form is considered suitable for activities where the government desires to have control over them in view of the public interest.

Features

1. It is totally financed by treasury and all the revenues are paid into treasury.

2. The budgeting, accounting and audit procedures are controlled and managed by the rules and regulations of the government.

3. The civil servants are the permanent staff.

4. The recruitment, training, promotion, terms and conditions of employment are same for all civil servants.

5. It is managed by the officials of the concerned department of the government.

6. The ministry is directly controlled by administrative staff.

7. The policy and performance are discussed in parliament.

8. It has no separate legal entity.

9. Nothing can be done without the permission of government.

Merits of Departmental Undertakings

The following are the merits of departmental undertakings,

(a) Fulfillment of Social Objectives: The government has total control over these undertakings. As such it can fulfill its social and economic objectives. For example, opening of post offices in far off places, broadcasting and telecasting programmes, which may lead to the social, economic and intellectual development of the people are the social objectives that the departmental undertakings try to fulfill.

(b) Responsible to Legislature: Questions may be asked about the working of departmental undertaking in the parliament and the concerned minister has to satisfy the public with his replies. As such they cannot take any step, which may harm the interest of any particular group of public. These undertakings are responsible to the public through the parliament.

(c) Control Over Economic Activities: It helps the government to exercise control over the specialized economic activities and can act as instrument of making social and economic policy.

(d) Contribution to Government Revenue: The surplus, if any, of the departmental undertakings belong to the government. This leads to increase in government income. Similarly, if there is deficiency, it is to be met by the government.

(e) Little Scope for Misuse of Funds: Since such undertakings are subject to budgetary accounting and audit control, the possibilities of misuse of their funds is considerably reduced.

Limitations of Departmental Undertakings

Departmental undertakings suffer from the following limitations,

(a) The Influence of Bureaucracy: On account of government control, a departmental undertaking suffers from all the ills of bureaucratic functioning.

For instance, government permission is required for each expenditure, observance of government decisions regarding appointment and promotion of the employees and so on. Because of these reasons important decisions get delayed, employees cannot be given instant promotion or punishment. On account of these reasons some difficulties come in the way of working of departmental undertakings.

(b) Excessive Parliamentary Control: On account of the Parliamentary control, difficulties come in the way of day-to-day administration. This is also because questions are repeatedly asked in the parliament about the working of the undertaking.

(c) Lack of Professional Expertise: The administrative officers who manage the affairs of the departmental undertakings do not generally have the business experience as well as expertise.

Hence, these undertakings are not managed in a professional manner and suffer from deficiency leading to excessive drainage of public funds.

(d) Lack of Flexibility: Flexibility is necessary for a successful business so that the demand of the changing times may be fulfilled. But departmental undertakings lack flexibility because its policies cannot be changed instantly.

(e) Inefficient Functioning: Such organizations suffer from inefficiency on account of incompetent staff and lack of adequate incentives to improve efficiency of the employees.

It may be noted that departmental form of organization for public enterprises is on its way to oblivion. Most undertakings such as those providing telephone, electricity services are now being converted into government companies. e.g., MTNL, BSNL and so on.

Merits	**Limitations**
(a) Fulfillment of social objectives	(a) The influence of Bureaucracy
(b) Responsibility to the public	(b) Excessive Parliamentary Control
(c) Control Over Economic Activities	(c) Lack of Professional Expertise
(d) Contribution to Government Revenue	(d) Lack of Flexibility
(e) Little Scope for Misuse of Funds	(e) Inefficient Functioning

Statutory Corporation (or public corporation) refers to a corporate body created by the Parliament or State Legislature by a special act which define its powers, functions and pattern of management. Statutory corporation is also known as public corporation. Its capital is wholly provided by the government. Examples of such organizations are Life Insurance Corporation of India, State Trading Corporation etc.

They are the most widely use form of organization under public enterprise. Under public corporation act 1961, statutory companies or public corporation are established. They are governed by the special act of the parliament.

It is managed and controlled by board of directors and boards of directors are appointed by the government. It is established for service motive. Its main aim is to maximize the social welfare. The

employees are appointed under the terms and conditions of the corporation. They are not civil servants. Some examples are Nepal Oil Corporation, Nepal Airlines Corporation.

Features

1. The act defines the objectives, functions, powers, rights and duties, privileges and relationship with other department of the government.

2. It is totally owned by the government.

3. In some cases, public may hold the portion of share capital.

4. It is a separate legal entity.

5. It can purchase and sell securities, can enter into any contract, can sue and can be sued.

6. It has independent accounting, auditing and financial system.

7. It is established for service motive.

8. Employees are appointed under the terms and conditions of the corporation.

9. It is managed and controlled by board of directors and boards of directors are appointed by the government.

10. They are governed by the special act of the parliament.

11. Its main aim is to maximize the social welfare.

Merits of Statutory Corporations

Statutory Corporation as a form of organization for public enterprises has certain advantages that can be summarized as follows,

(a) Expert Management: It has the advantages of both the departmental and private undertakings. These enterprises are run on business principles under the guidance of expert and experienced Directors.

(b) Internal Autonomy: Government has no direct interference in the day-to-day management of these corporations. Decisions can be taken promptly without any hindrance.

(c) Responsible to Parliament: Statutory organizations are responsible to Parliament. Their activities are watched by the press and the public. As such they have to maintain a high level of efficiency and accountability.

(d) Flexibility: As these are independent in matters of management and finance, they enjoy adequate flexibility in their operation. This helps in ensuring good performance and operational results.

(e) Promotion of National Interests: Statutory Corporations protect and promote national interests. The government is authorized to give policy directions to the statutory corporations under the provisions of the acts governing them.

(f) Easy to Raise Funds: Being government owned statutory bodies, they can easily get the required funds by issuing bonds etc.

Limitations of Statutory Corporations

Having studied the merits of statutory corporations we may now look to its limitations also. The following limitations are observed in statutory corporations.

(a) Government Interference: It is true that the greatest advantage of statutory corporation is its independence and flexibility, but it is found only on paper. In reality, there is excessive government interference in most of the matters.

(b) Rigidity: The amendments to their activities and rights can be made only by the Parliament. This results in several impediments in business of the corporations to respond to the changing conditions and take bold decisions.

(c) Ignoring Commercial Approach: The statutory corporations usually face little competition and lack motivation for good performance. Hence, they suffer from ignorance of commercial principles in managing their affairs.

Merits	Limitations
(a) Expert Management	(a) Government Interference
(b) Internal Autonomy	(b) Rigidity
(c) Responsible to Parliament	(c) Ignoring Commercial Approach
(d) Flexibility	
(e) Promotion of National Interest	
(f) Easy to Raise Funds	

Government Company refers to the company in which 51 percent or more of the paid up capital is held by the government. It is registered under the Companies Act and is fully governed by the provisions of the Act. Most business units owned and managed by government fall in this category.

A public enterprise which is established under the prevailing law of the country is called a government company. In this company, government owns at least 51% of total shares. This type of company is a popular form of company because it is easy to organize and is considered to be more efficient. It is incorporated under company law of the country. It doesn't need any special act for its incorporation. There are 2 types of Government Company. They are as follows,

1. It is totally owned by government

2. At least 51% of its shares is taken up by government

Features

1. It is incorporated under company law of the country.

2. At least 7 promoters are required for incorporation.

3. It can purchase and sell securities, can enter into any contract, can sue and can be sued.

4. It is totally owned by government or at least 51% of its shares is taken up by government.

5. It is financed by the government.

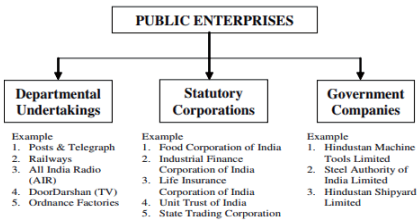
6. Expenditure and revenues are not shown in the budget of department.

7. Employees are not civil servants.

8. The policies are mentioned in memorandum and articles of association.

9. The budgeting, accounting and audit procedures are not controlled and managed by the rules and regulations of the government.

10. Activities of the company are accountable to the parliament.



Merits of Government Companies

The merits of government company form of organizing a public enterprise are as follows,

(a) Simple Procedure of Establishment: A government company, as compared to other public enterprises, can be easily formed as there is no need to get a bill passed by the parliament or state legislature. It can be formed simply by following the procedure laid down by the Companies Act.

(b) Efficient Working on Business Lines: The government company can be run on business principles. It is fully independent in financial and administrative matters. Its Board of Directors usually consists of some professionals and independent persons of repute.

(c) Efficient Management: As the Annual Report of the government company is placed before both the house of Parliament for discussion, its management is cautious in carrying out its activities and ensures efficiency in managing the business.

(d) Healthy Competition: These companies usually offer a healthy competition to private sector and thus, ensure availability of goods and services at reasonable prices without compromising on the quality.

Limitations of Government Companies

The government companies suffer from the following limitations,

(a) Lack of Initiative: The management of government companies always have the fear of public accountability. As a result, they lack initiative in taking right decisions at the right time. Moreover, some directors may not take real interest in business for fear of public criticism.

(b) Lack of Business Experience: In practice, the management of these companies is generally put into the hands of administrative service officers who often lack experience in managing the business organization on professional lines. So, in most cases, they fail to achieve the required efficiency levels.

(c) Change in Policies and Management: The policies and management of these companies generally keep on changing with the change of government. Frequent change of rules, policies and procedures leads to an unhealthy situation of the business enterprises.

Merits	Limitations
(a) Simple procedure of establishment	(a) Lack of initiative
(b) Efficient working on Business lines	(b) Lack of business experience
(c) Efficient management	(c) Change of policies and management
(d) Healthy competition	

Department board

They are established in the form of development board. They are needed to contact different ministry for the incorporation. Its main aim is to operate public welfare development work. It is established under development board act 2013. For e.g trade promotion center, cottage and small industry development board etc.

4.3 Business Cycles: Meaning and Features - Phases of a Business Cycle

The business cycle is the natural rise and fall of economic growth that occurs over time. The cycle is a useful tool for analyzing the economy. It can also help you make better financial decisions

Several free enterprise capitalist countries such as USA and Great Britain have registered rapid economic growth during the last 2 centuries. But economic growth in these countries has not followed steady and smooth upward trend.

There has been a long-run upward trend in Gross National Product (GNP), but periodically there have been large short - run fluctuations in economic activity, that is, changes in output, income, employment and prices around this long - term trend.

Characteristics of Business Cycle

• The fluctuations are wave like movement and are recurrent in nature.

• Business Cycle is characterized by waves of expansion and contraction. But these are not only 2 phases of business cycle. There are four phase of business cycle - Expansion, Recession, Contraction and Revival or Recovery.

• Business Cycle is self generating. Every phase has germs of the next phase, that is, expansion has the germs of the recession in it.

• The movement from peak to trough and again though to peak is not symmetrical. According to Keynes, prosperity phase of business cycle comes to end fast but dip is gradual and slow.

Business cycles are everything which determines our business objectives

The period of high income, output and employment has been called the period of expansion, upswing or prosperity and the period of low income, output and employment has been described as contraction, recession, downswing or depression. The economic history of the free market capitalist countries has shown that the period of economic prosperity or expansion alternates with the period of contraction or recession.

These alternating periods of expansion and contraction in economic activity has been called business cycles. They are also known as trade cycles. J.M. Keynes writes, “A trade cycle is composed of periods of good trade characterized by rising prices and low unemployment percentages with periods of bad trade characterized by falling prices and high unemployment percentages.”

A noteworthy feature about these fluctuations in economic activity is that they are recurrent and have been occurring periodically in a more or less regular fashion. Therefore, these fluctuations have been called business cycles. It might be noted that calling these fluctuations as ‘cycles’ mean they are periodic and occur regularly, though perfect regularity has not been observed.

The duration of a business cycle has not been of the same length; it has varied from a minimum of two years to a maximum of ten to twelve years, though in the past it was often assumed that fluctuations of output and other economic indicators around the trend showed repetitive and regular pattern of alternating periods of expansion and contraction.

However, actually there has been no clear evidence of very regular cycles of the same definite duration. Some business cycles have been very short lasting for only two to three years, while others have lasted for many years. Further, in some cycles there have been large swings away from trend and in others these swings have been of moderate nature.

A significant point worth noting about business cycles is that they have been very costly in the economic sense of the word. During a period of recession or depression several workers lose their jobs and as a result large - scale unemployment, which causes loss of output that could have been produced with full-employment of resources, come to prevail in the economy.

Besides, during depression many businessmen go bankrupt and suffer big losses. Depression causes a lot of human sufferings and lowers the levels of living of the people. Fluctuations in economic activity create a lot of uncertainty in the economy which causes anxiety to the individuals about their future income and employment opportunities and involve a great risk for long - run investment in projects.

Who does not remember the great havoc caused by the great depression of the early thirties of the present century. Even boom when it is accompanied by inflation has its social costs. Inflation erodes the real incomes of the people and creates life miserable for the poor people.

Inflation distorts allocation of resources by drawing away scarce resources from productive uses to unproductive ones. Inflation redistributes income in favor of the richer actions and also when inflation rate is high, it impedes economic growth.

About the harmful effects of the business cycles Crowtoe writes, “On the one hand, there is the misery and shame of unemployment with all the individual poverty and social disturbances that it may create. On the other hand, there is the loss of wealth represented by so much wasted and idle labour and capital”.

Features of Business Cycles

Though different business cycles differ in duration and intensity they have some common features which we explain below as,

1. Business cycles are Synchronic. That is, they do not cause changes in any single industry or sector but are of all embracing character. For example, depression or contraction occurs simultaneously in all industries or sectors of the economy.

Recession passes from one industry to another and chain reaction continues till the whole economy is in the grip of recession. Similar process is at work in the expansion phase, prosperity spreads through different linkages of input-output relations or demand relations between various industries and sectors.

2. Business cycles occur periodically. Though they do not show same regularity, they have some distinct phases such as expansion, peak, contraction or depression and trough. Further the duration of cycles varies a good deal from minimum of two years to a maximum of ten to twelve years.

3. Thirdly, it has been observed that fluctuations occur not only in level of production but also simultaneously in other variables such as employment, investment, consumption, rate of interest and price level.

4. An important feature of business cycles is that consumption of non-durable goods and services does not vary much during different phases of business cycles. Past data of business cycles reveal that households maintain a great stability in consumption of non - durable goods.

5. Another important feature of business cycles is that investment and consumption of durable consumer goods such as cars, houses, refrigerators are affected most by the cyclical fluctuations. As stressed by J.M. Keynes, investment is greatly volatile and unstable as it depends on profit expectations of private entrepreneurs.

These expectations of entrepreneurs change quite often creating investment quite unstable. Since consumption of durable consumer goods can be deferred, it also fluctuates greatly during the course of business cycles.

6. Another important feature of business cycles is profits fluctuate more than any other type of income. The occurrence of business cycles causes a lot of uncertainty for businessmen and makes it difficult to forecast the economic conditions.

7. During the depression period profits might even become negative and many businesses go bankrupt. In a free market economy, profits are justified on the ground that they are necessary payments if the entrepreneurs are to be induced to bear uncertainty.

8. The immediate impact of depression and expansion is on the inventories of goods. When depression sets in, the inventories start accumulating beyond the desired level. This leads to cut in production of goods.

On the contrary, when recovery starts, the inventories go below the desired level. This encourages businessmen to place more orders for goods whose production picks up and stimulates investment in capital goods.

For example, if there is a recession in the USA, which is a large importer of goods from other countries, will cause a fall in demand for imports from other countries whose exports would be adversely affected causing recession in them too. Depression of 1930s in USA and Great Britain engulfed the entire capital world.

9. Lastly, business cycles are international in character. That is, once started in one country they spread to other countries through trade relations between them.

4.3.1 Phases of a Business Cycle

Business Cycle (or Trade Cycle) is divided into the following phases as follows,

1. Prosperity Phase: Expansion or Boom or Upswing of economy.

2. Peak Phase: Attains the maximum limit of growth.

3. Recession Phase: From prosperity to recession (upper turning point).

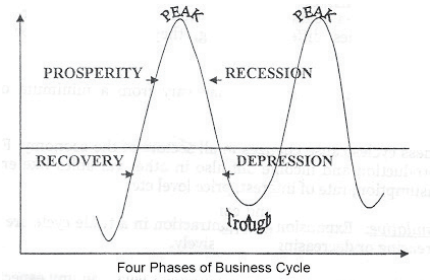
4. Depression Phase: Contraction or Downswing of economy.

5. Trough Phase: Reaches the lowest limit of growth.

6. Recovery Phase: From depression to prosperity (lower turning Point).

Diagram of Phases of Business Cycle

The phases of business cycles are shown in the following diagram,



Four Phases of Business Cycle

The business cycle begins from a trough (lower point) and passes through a recovery phase followed by a period of expansion (upper turning point) and prosperity. After the peak point is reached there is a declining phase of recession followed by a depression. Again the business cycle continues similarly with ups and downs.

Explanation of Phases of Business Cycle

The phases of a business cycle are briefly explained as follows,

1. Prosperity Phase

When there is an expansion of output, income, employment, prices and profits, there is also a rise in the standard of living. This period is termed as Prosperity phase.

The features of prosperity are,

- High level of effective demand.
- High level of output and trade.
- Rising interest rates.
- High level of income and employment.
- Large expansion of bank credit.

• Inflation.

• Overall business optimism.

• A high level of MEC (Marginal efficiency of capital) and investment.

Due to full employment of resources, the level of production is maximum and there is a rise in GNP (Gross National Product). Due to a high level ofeconomic activity, it causes a increase in prices and profits. There is an upswing in the economic activity and economy reaches its peak. This is also called as a boom period.

2. Peak Phase

The economy then reaches a saturation point, or peak, which is the second stage of the business cycle. The maximum limit of growth is attained. The economic indicators do not grow further and are at their highest. Prices are at their peak. This stage marks the reversal in the trend of economic growth. Consumers tend to restructure their budget at this point.

3. Recession Phase

The turning point from prosperity to depression is termed as recession phase.

During a recession period, the economic activities slow down. When demand starts falling, the overproduction and future investment plans are also given up. There is a steady decline in the output, employment, prices and profits.

The businessmen lose confidence and become pessimistic (Negative). It reduces investment. The banks and the people try to get greater liquidity, so credit also contracts. Expansion of business stops, stock market falls. Orders are canceled and people start losing their jobs. The increase in unemployment causes a sharp decline in income and aggregate demand. Generally, recession lasts for a short period.

4. Depression Phase

When there is a continuous decrease of output, employment, income, prices and profits, there is a fall in the standard of living and depression sets in.

The features of depression are,

• Fall in income and rise in unemployment.

• Fall in volume of output and trade.

• Deflation.

• Fall in interest rate.

• Contraction of bank credit.

• Fall in MEC (Marginal efficiency of capital) and investment.

• Overall business pessimism.

In depression, there is under - utilization of resources and fall in GNP (Gross National Product). The aggregate economic activity is at the lowest, causing a decline in prices and profits until the economy reaches its trough (low point).

5. Trough Phase

In depression stage, the economy's growth rate becomes negative. There is further decline until the prices of factors, as well as the demand and supply of goods and services, reach their lowest. The economy eventually reaches the trough. This is the lowest it can go. It is the negative saturation point for an economy. There is extensive depletion of national income and expenditure.

6. Recovery Phase

The turning point from depression to expansion is termed as recovery or revival phase.

During the period of revival or recovery, there are expansions and rise in economic activities. When demand starts rising, production increases and this causes an increase in investment. There is a steady rise in output, income, employment, prices and profits. The businessmen gain confidence and become optimistic (Positive). This increases investments.

The stimulation of investment brings about the revival or recovery of the economy. The banks expand credit, business expansion takes place and stock markets are activated. There is an increase in employment, production, income and aggregate demand, prices and profits start rising and business expands. Revival slowly emerges into prosperity and the business cycle is repeated.

Thus, we see that during the expansionary or prosperity phase, there is inflation and during the contraction or depression phase, there is a deflation.

5

INTRODUCTION TO ACCOUNTING & FINANCIAL ANALYSIS

Introduction to Double Entry Systems - Preparation of Financial Statements-Analysis and Interpretation of Financial Statements-Ratio Analysis - Preparation of Funds flow and cash flow statements (Simple Problems).

5.1 Introduction to Double Entry Systems

The first and the most important accounting lesson relates to the double entry system. It is vital to build the foundations and understand how the double entry systems works, what are the rules that we will need to follow to accurately record business transactions.

Double Entry:

In this system, every business transaction is having a two effect of benefits giving and benefit receiving aspects. The recording is made on the basis of both these aspects. Double entry is an accounting system which records the effects of transactions and other events in at least two accounts with equal debits and credits.

Meaning of Debit and Credit

The term 'debit' is supposed to have derived from 'debit' and the term 'credit' from 'creditable'. For convenience 'Dr' is used for debit and 'Cr' is used for credit. Recording of transactions require a thorough understanding of the rules of debit and credit related to the accounts. Both debit and credit may represent either increase or decrease, depending upon the nature of account.

Steps involved in Double entry system

(a) Preparation of Journal:

Journal is called as the book of original entry. It records the effect of all transactions for the first time. Here the job of recording takes place.

(b) Preparation of Ledger:

Ledger is the collection of all accounts used by a business. Here, the grouping of accounts is performed. Journal is posted to ledger.

(c) Trial Balance preparation:

It is a summary of ledge balances prepared in the form of a list.

(d) Preparation of Final Account:

At the end of the accounting period to know the achievements of the organization and its financial state of affairs, the final accounts are prepared.

Advantages of Double Entry System

1. Complete record of transactions: This system maintains a complete record of all business transactions.

2. Scientific system: This system is recording business transactions in a set of accounting records. It helps to attain the objectives of accounting.

3. Ascertainment of profit or loss: The profit earned or loss suffered during a period can be ascertained together with details by the preparation of profit and loss account.

4. A check on the accuracy of accounts: By use of this system the accuracy of accounting book can be established through the device called as trail balance.

5. Full details for purposes of control: This system permits accounts to be prepared or kept in as much detail as necessary and therefore, affords significant information for purposes of control etc.

6. Knowledge of the financial position of the business: The financial position of the firm can be ascertained at the end of each period, through the preparation of balance sheet.

7. Comparative study is possible: Results of one year may be compared with those of the precious year and reasons for the change might be ascertained.

8. No scope for fraud: The firm is saved from frauds and misappropriations since full information about all assets and liabilities will be available.

9. Helps management in decision making: The management is to obtain good information for its work, specially for making decisions.

5.2 Preparation of Financial Statements-Analysis and Interpretation of Financial Statements-Ratio Analysis

A complete set of financial statements comprise of:

(1) An income statement, recent standards now require a statement of comprehensive income.

(2) A statement of changes in equity.

(3) A balance sheet, also known as statement of financial position.

(4) A statement of cash flows

(5) Notes to financial statements or supplementary notes.

Preparation of your financial statements is one of the last steps in the accounting cycle, using information from the previous statements to develop the current financial statement. Additionally, based on your needs, we can provide a financial statement analysis and file quarterly and year-end statements.

Financial Statement Preparations

Prepare Income Statement - The income statement calculates the net profit or loss, which are determined by sales revenue, expenses, and general ledger records.

Prepare Statement of Retained Earnings - The statement of retained earnings reflects the distribution of profit between retained earnings and dividends.

Prepare Balance Sheet - The balance sheet illustrates the company's financial position – it's a snapshot of the last day of the accounting cycle.

Prepare Cash Flow Statement - From a cash basis, the statement of cash flow is a compilation and comparison of information from the three main financial reports: income, retained earnings, and balance sheet.

Financial Statement Analysis - Business owners may not need all the details, but they definitely need to understand the big picture of their current financial and cash positions. These insights are crucial when making business operation decisions.

File Financial Statement Reports - All companies, foreign and domestic, are required to file registration statements, periodic reports, and other forms electronically through the Electronic Data Gathering, Analysis, and Retrieval system (EDGAR). The purpose of EDGAR is to increase the efficiency and fairness of the securities market for the benefit of investors, corporations, and the economy via a time-sensitive collection tool.

Types of Financial Analysis:

The process of analysis may take the varying types. Normally, it is classified into different

categories on the basis of information used and on the basis of modus operandi.

(a) On the basis of Information Used:

(i) External analysis.

(ii) Internal analysis.

External analysis is an analysis based on information easily available to outsiders (externals) for the business. Outsiders include creditors, suppliers, investors and government agencies regulating the business in a normal way.

These parties do not have access to the internal records (information) of the concern and generally obtain data for analysis from the published financial statements. Thus, an analysis done by outsiders is known as external analysis.

Internal analysis is an analysis done on the basis of information obtained from the internal and unpublished records and books. While conducting this analysis, the analyst is a part of the enterprise he is analyzing.

Analysis for managerial purposes is the internal type of analysis and is conducted by executives and employees of the enterprise as well as governmental and court agencies which may have major regulatory and other jurisdiction over the business.

(b) On the basis of Modus Operandi:

They are classified into two kinds,

(i) Horizontal analysis

(ii) Vertical analysis

Horizontal analysis is also known as 'dynamic analysis' or 'trend analysis'. This analysis is done by analyzing the statements over a period of time. Under this analysis, we try to examine as to what has been the periodical trend of various items shown in the statement. The horizontal analysis consists of a study of the behaviour of each of the entities in the statement.

Vertical analysis is also known as 'static analysis' or 'structural analysis'. It is made by analyzing a single set of financial statement prepared at a particular date. Under such a type of analysis, quantitative relationship is established between the different items shown in a particular statement. Common size statements are the form of vertical analysis. Thus, vertical analysis is the study of quantitative relationship existing among the items of a particular data.

When the adjusting entries have been entered onto a worksheet, the financial statements are prepared using information from the ledger accounts. Because some of the financial statements uses data from the other statements, the following is a logical order for their preparation,

- Income statement
- Statement of retained earnings
- Balance sheet
- Cash flow statement

Income Statement

The income statement reports revenues, expenses and the resulting net income. It is made by transferring the following ledger account balances, taking into account any adjusting entries that have been or will be made,

- Expenses
- Capital gains or losses
- Revenue

Statement of Retained Earnings

The retained earnings statement represents the retained earnings at the beginning and end of the accounting period. It is created by using the following information,

- Beginning retained earnings, obtained from the previous statement of retained earnings.
- Net income, obtained from the income statement.
- Dividends paid during the accounting period.

Balance Sheet

The balance sheet reports the assets, liabilities and shareholder equity of the company. It is constructed using the following information,

- Balances of all asset accounts such cash, accounts receivable, etc.
- Capital stock balance.
- Balances of all liability accounts such as accounts payable, notes, etc.
- Retained earnings, obtained from the statement of retained earnings.

Cash Flow Statement

The cash flow statement describes the reasons for changes in the cash balance, showing sources and uses of cash in the operating, financing and investing activities of the firm.

Because the cash flow statement is a cash-basis report, it cannot be derived directly from the ledger account balances of an accrual accounting system. Rather, it is derived by converting the accrual information to a cash-basis using one of the following two methods,

- **Direct method:** Cash flow information is derived by directly subtracting cash disbursements from cash receipts.

• **Indirect method:** Cash flow information is derived by adding or subtracting non-cash items from net income.

Introduction to analysis and Interpretation of Financial Statements:

Analysis and interpretation of financial statements are an attempt to determine the significance and meaning of the financial statement data so that a forecast may be made of the prospects for future earnings, ability to pay interest, debt maturities, both current as well as long term and profitability of sound dividend policy.

The main function of financial analysis is the pinpointing of the strength and weaknesses of a business undertaking by regrouping and analysis of figures contained in financial statements, by making comparisons of various components and by examining their content. The analysis and interpretation of financial statements represent the last of the four major steps of accounting.

The first three steps involving the work of the accountant in the accumulation and summarization of financial and operating data as well as in the construction of financial statements are as follows,

(i) Analysis of each transaction to determine the accounts to be debited and credited and the measurement and variation of each transaction to determine the amounts involved.

(ii) Recording of the information in the journals, summarization in ledgers and preparation of a worksheet.

(iii) Preparation of financial statements.

The fourth step of accounting, the analysis and interpretation of financial statements, results in the presentation of information that aids the business managers, investors and creditors.

Interpretation of financial statements involves many processes like arrangement, analysis, establishing relationship between available facts and drawing conclusions on that basis.

Preliminaries Required for Analysis and Interpretation of Financial Statements:

The following procedures are required to be completed for making an analysis and interpretation of financial statements,

(i) Data should be presented in some logical way.

(ii) Data should be analyzed for preparing comparative statements.

(iii) All data shown in financial statements should be studied just to understand their significance.

(iv) The objective and extent of analysis and interpretation should be determined.

(v) Facts disclosed by the analysis should be interpreted taking into account economic facts.

(vi) Interpreted data and information should be in a report form.

Objectives of Analysis and Interpretation of Financial Statements:

The following are the some of the common objectives of interpretation,

(i) To investigate the future potential of the concern.

(ii) To determine the profitability and future prospects of the concern.

(iii) To make comparative study of operational efficiency of similar concerns.

(iv) To examine the earning capacity and efficiency of various business activities with the help of income statements.

(v) To estimate about the performance efficiency and managerial ability.

(vi) To determine short term and long term solvency of the business concerns.

(vii) To enquire about the financial position and ability to pay of the concerns.

Importance of Analysis and Interpretation of Financial Statements:

The following factors have increased the importance of the analysis and interpretation of financial statements,

(i) Decision taken on the basis of intuition may be wrong and defective on the other hand. Analysis and interpretation are based on some logical and scientific methods and hence decisions taken on that basis seldom prove to be misleading and wrong.

(ii) The user as individual has a very limited personal experience. He can only understand the complexities of business and mutual relationship by observation and external experience. Thus, it becomes necessary that financial statements in an implicit form should be analyzed in an intelligible way.

(iii) Decision or conclusions based on scientific analysis and interpretation are relative and easy to be read and understood by other people.

(iv) Even to verify and examine the correctness and accuracy of the decisions already taken on the basis of intuition, analysis and interpretation are essential.

Techniques of Analysis and Interpretation:

The most important techniques of analysis and interpretation are,

1. Ratio Analysis

2. Fund Flow Analysis

3. Cash Flow Analysis

1. Ratio Analysis:

Two individual items on the statements can be compared with one another and the relationship is expressed as a ratio. Ratios are computed for items on the same financial statement or on different statements. These ratios are compared with those of prior years and with those of other companies to make them more meaningful.

A ratio is a simple mathematical expression. Ratio may be expressed by a number of ways. It is a number expressed in terms of another number. It is a statistical yard stick that provides a measure of relationship between two figures.

2. Fund Flow Analysis:

Funds Flow Analysis has been the salient feature of the evolution of accounting theory and practice. The financial statement of a business provides only some information about financial activities of a business in a limited manner. The income statement deals solely with operations and the balance sheet shows the changes in the assets and liabilities.

In fact, these statements are substantially an analysis of static aspects of financial statements. Under this context, it is imperative to study and to analyze the fund movements in the business concern. Such a study or analysis may be undertaken by using another tool of financial analysis, which is called 'Statement of Sources and Uses of Funds' or simply 'Fund Statement' or Fund Flow Analysis.

This statement is also called by other several names and they are,

(a) Application of Funds Statement.

(b) Statement of Sources and Applications of Funds.

(c) Statement of Funds Supplied and Applied.

(d) Where Got and Where Gone Statement.

(e) Statement of Resources Provided and Applied.

(f) Fund Movement Statement.

(g) Inflow-Outflow of Fund Statement.

Fund statement is a new contribution of science of accounting but has become the doyen of tools of Financial Analysis.

3. Cash Flow Analysis:

Fund flow statement fails to convey the quantum of inflow of cash and outflow of cash. When we say cash, we refer to the cash as well as the bank balances of the company at the end of the accounting period as reflected in the balance sheet of the company. Cash is a current asset like inventory and accounts receivables. Cash reflects its liquidity position.

The term cash can be viewed in two senses. In a narrow sense, it includes actual cash in the form of notes and coins and bank drafts held by a firm and the deposits withdrawable on demand, the company has held in commercial banks. But in a broader sense, it also includes 'marketable securities' which are those securities which can be immediately sold or converted into cash if required.

Cash flow statement is a statement of cash flow and cash flow signifies the movements of cash in and out of a business concern. Inflow of cash is known as sources of cash and outflow of cash is called uses of cash. This statement also depicts factors for such inflow and outflow of cash.

Thus, cash flow statement is a statement designed to highlight upon the causes which bring changes in cash position between two balance Sheet's dates. It virtually takes the nature and character of cash receipts and cash payments though the basic information used in the preparation of this statement differs from that which is used in recording cash receipts and cash payments.

This is particularly useful to the management, credit grantors, investors and others. As regards the management, it is helpful in budgeting cash requirements.

Financial Ratios Analysis

Financial ratios analysis is the most common form of financial statements analysis. Financial ratios represent the relationships between different aspects of a company's operations and provide relative measures of the firm's conditions and performance. Financial ratios might provide clues and symptoms of the financial condition and indications of potential problem areas.

Financial ratios generally hold no meaning unless they are compared against something else, like past performance, another company/competitor or industry average. Thus, the ratios of firms in different industries, which face different conditions are usually hard to compare.

Financial ratios can be an important tool for small business owners and managers to measure their progress towards reaching company objectives, as well as towards competing with larger companies within an industry.

In addition, tracking different ratios over time is a powerful way to identify trends. Ratio analysis, when performed regularly over time, can also help small businesses recognize and adapt to trends affecting their operations.

Financial ratios are also used by bankers, investors and business analysts to assess different attributes of a company's financial strength or operating results. This is another reason why

business owners need to understand financial ratios because, very often, a business's ability to get financing or equity financing will depend on the company's financial ratios.

Financial ratios are categorized according to the financial aspect of the business which the ratio measures. In the analysis of financial statements it is better to have a complete understanding of the different types of ratios, their calculation, and interpretation. Financial ratios can be classified into five types as follows,

- **Profitability ratios** measure the company's use of its assets and control of its expenses to generate an acceptable rate of return.

- **Liquidity ratios** investigates the availability of company's cash to pay debt.

- **Efficiency ratios** measure how quickly a firm converts non-cash assets to cash assets.

- **Leverage ratios** examine the company's methods of financing and measure its ability to meet financial obligations.

- **Market ratios** measure investor response to owning a company's stock and also the cost of issuing stock.

Despite all the positive uses of financial ratios, however, business managers and owners are still encouraged to know the limitations of ratios and approach financial ratio analysis with a degree of caution.

5.3 Preparation of Funds flow and cash flow statements (Simple Problems)

Funds Flow Statement

It is a statement prepared to analyze the reasons for changes in the financial position of a company between two balance sheets. It represents the inflow and outflow of funds i.e., sources and applications of funds for a particular period. In other words, a funds flow statement is prepared to explain the changes in the working capital position of a company.

There are two types of inflows of funds,

1. Long term funds raised by issue of shares, debentures or sale of fixed assets.

2. Funds generated from operations.

If the long term fund needs of a company are met just out of the long term sources of funds, then the entire fund generated from operations will be represented by increase in working capital. However, if the funds generated from operations are not sufficient to bridge a gap of long term fund requirements, then there will be a decline in working capital.

Difference between Funds Flow Statement and Cash Flow Statement

Both fund flow statement and cash flow statement are used in analysis of part transactions of a business firm.

However, there are some differences between the two as given below,

1. Funds flow statement analyze the sources and application of funds of long term nature and the net increase or decrease in long term funds will be reflected on the working capital of the firm. The cash flow statement only considers the increase or decrease in current assets or current liabilities in calculating the cash flow of funds from operations.

2. Funds flow statement is more useful for long term financial planning. Cash flow analysis is more useful for identifying and correcting the liquidity problems of the firm.

3. Funds flow statement is based on the accrual system of accounting. However, in case of cash flow statement only the transactions effecting cash or cash equivalents are taken into consideration.

Steps for Preparing Funds Flow Statement:

The steps involved in preparing the statement are as follows,

1. Find the change (increase or decrease) in working capital.

2. Find the adjustments account to be made to net income.

3. For each non-current account on the balance sheet, establish the increase or decrease in that account. Analyze the change to decide whether it is a source (increase) or use (decrease) of working capital.

4. Be sure the total of all sources including those from operations minus the total of all uses equals the change found in working capital in step 1.

General Rules for Preparing Funds Flow Statement:

The following general rules should be observed while preparing funds flow statement,

1. Increase in a current asset means increase (plus +) in working capital.

2. Decrease in a current asset means decrease (minus -) in working capital.

3. Increase in a current liability means decrease (minus -) in working capital.

4. Decrease in a current liability means increase (plus +) in working capital.

5. Increase in current asset and increase in current liability does not affect working capital.

6. Decrease in current asset and decrease in current liability does not affect working capital.

7. Changes in fixed (non-current) assets and fixed (non-current) liabilities affects working capital.

Format of Funds Flow Statement:

A funds flow statement can be prepared in statement form or 'T' form.

Both the formats are given below,

Fund Flow Statements (Statement Form)

A.	**Sources of Funds:**	
	(*i*) Funds from Business Operations	
	(*ii*) Sale of Fixed Asset	
	(*iii*) Issue of Shares	
	(*iv*) Issue of Debentures	
	(*v*) Long-term borrowings	
	Total Sources	
B.	**Application of Funds:**	
	(*i*) Loss from Business Operation	
	(*ii*) Payment of Dividend	
	(*iii*) Payment of Tax	
	(*iv*) Purchase of Fixed Asset	
	(*v*) Payment of Long-term Loans	
	(*vi*) Redemption of Debentures	
	(*vii*) Redemption of Preference Shares	
	Total uses	
	Not increase/decrease in Working Capital (Total sources minus Total uses)	

Fund Flow Statements ('T' Form)

Source of Funds	₹	Application of Funds	₹
(*i*) Funds from Business Operations		(*i*) Loss from Business Operations	
(*ii*) Sale of Fixed Assets		(*ii*) Payment of Dividend	
(*iii*) Issue of Shares		(*iii*) Payment of Tax	
(*iv*) Issue of Debentures		(*iv*) Purchase of Fixed Assets	
(*v*) Long-term Borrowings		(*v*) Payment of Long-term Loans	
(*vi*) Decrease in Working Capital (If application amount is more than the sources amount)		(*vi*) Redemption of Debentures	
		(*vii*) Redemption of Preference Shares	
		(*viii*) Increase in Working Capital (if sources are more than the application amount)	
Total		Total	

Funds Flow Statement (Statement Form)

A.	**Sources of Funds:**
	(*i*) Funds from Business Operations
	(*ii*) Sale of Fixed Asset
	(*iii*) Issue of Shares
	(*iv*) Issue of Debentures
	(*v*) Long-term borrowings
	Total Sources
B.	**Application of Funds:**
	(*i*) Loss from Business Operation
	(*ii*) Payment of Dividend
	(*iii*) Payment of Tax
	(*iv*) Purchase of Fixed Asset
	(*v*) Payment of Long-term Loans
	(*vi*) Redemption of Debentures
	(*vii*) Redemption of Preference Shares
	Total uses
	Not increase/decrease in Working Capital (Total sources minus Total uses)

Funds Flow Statement ('T' Form)

Source of Funds	₹	Application of Funds	₹
(*i*) Funds from Business Operations		(*i*) Loss from Business Operations	
(*ii*) Sale of Fixed Assets		(*ii*) Payment of Dividend	
(*iii*) Issue of Shares		(*iii*) Payment of Tax	
(*iv*) Issue of Debentures		(*iv*) Purchase of Fixed Assets	
(*v*) Long-term Borrowings		(*v*) Payment of Long-term Loans	
(*vi*) Decrease in Working Capital (If application amount is more than the sources amount)		(*vi*) Redemption of Debentures	
		(*vii*) Redemption of Preference Shares	
		(*viii*) Increase in Working Capital (if sources are more than the application amount)	
Total		Total	

Cash Flow Statement

A cash flow statement is one of the major financial statements for a project or business. The statement can be as simple as a one page analysis or might involve several schedules that feed information into a central statement.

A cash flow statement is a listing of the flows of cash into and out of the business or project. Think of it as our checking account at the bank. Deposits are the cash inflow and withdrawals (checks) are the cash outflows. The balance in our checking account is our net cash flow at a specific point in time.

The Structure of the CFS

The cash flow statement varies from the income statement and balance sheet because it does not include the amount of future incoming and outgoing cash that has been recorded on credit.

Therefore, cash is not the same as net income, which, on the income statement and balance sheet, includes cash sales and sales made on credit. Cash flow is determined by looking at three components by which cash enters and leaves a company.

- Core operations
- Investing
- Financing

Operations

Measuring the cash inflows and outflows caused by core business operations, the operations component of cash flow reflects how much cash is generated from a company's products or services. Generally, changes made in cash, depreciation, accounts receivable, inventory and accounts payable are reflected in cash from operations.

Cash flow is determined by making certain adjustments to net income by adding or subtracting differences in revenue, expenses and credit transactions (appearing on the balance sheet and income statement) resulting from transactions that occur from one period to the next.

These adjustments are made because non-cash items are calculated into net income (income statement) and total assets and liabilities (balance sheet). So, because not all transactions involve actual cash items, several items have to be re-evaluated when calculating cash flow from operations.

For example, depreciation is not really a cash expense, it is an amount that is deduced from the total value of an asset that has previously been accounted for. That is why it is added back into net sales for calculating cash flow. The only time income from an asset is accounted for in CFS calculations is when the asset is sold.

Changes in accounts receivable on the balance sheet from one accounting period to the next must also be reflected in cash flow. If accounts receivable decreases, this implies that more cash has entered the company from customers paying off their credit accounts - the amount by which AR has reduced is then added to net sales.

If accounts receivable increase from one accounting period to the next, the amount of the increase should be deducted from net sales because, although the amounts represented in AR are revenue, they are not cash. An increase in inventory, on the other hand, signals that a company has spent more money to purchase more raw materials.

If the inventory was paid with cash, the increase in the value of inventory is deducted from the net sales. A decrease in inventory would be added to net sales. If inventory was purchased on credit, an increase in accounts payable would occur on the balance sheet and the amount of the increase from one year to the other would be added to net sales.

The same logic is true for taxes payable, salaries payable and prepaid insurance. If something has been paid off, then the variation in the value owed from one year to the next has to be subtracted from net income. If there is an amount that is still owed, then any differences will have to be added to net earnings.

Investing changes in equipment, assets or investments relate to cash from investing. Generally, cash changes from investing are a "cash out" item, because cash is used to buy new equipment, buildings or short-term assets such as marketable securities. However, when a company divests of an asset, the transaction is considered "cash in" for calculating cash from investing.

Financing changes in debt, loans or dividends are accounted for in cash from financing. Changes in cash from financing are "cash in" when capital is increased and they are "cash out" when dividends are paid. Thus, if a company issues a bond to the public, the company receives cash financing. However, when interest is paid to bondholders, the company is reducing its cash.

Analyzing an Example of a CFS

Cash Flow Statement Company XYZ FY Ended 31 Dec 2003 all figures in USD	
Cash Flow From Operations	
Net Earnings	2,000,000
Additions to Cash	
Depreciation	10,000
Decrease in Accounts Receivable	15,000
Increase in Accounts Payable	15,000
Increase in Taxes Payable	2,000
Subtractions From Cash	
Increase in Inventory	(30,000)
Net Cash from Operations	2,012,000
Cash Flow From Investing	
Equipment	(500,000)
Cash Flow From Financing	
Notes Payable	10,000
Cash Flow for FY Ended 31 Dec 2003	**1,522,000**

Problems

1. The following are the summarized balance sheets of M/s. Krishna Ltd. as on 31.12.1999 and 2000.

Liabilities		
	1999	2000
10% preference shares	1,00,000	1,10,000

Equity Shares	2,20,000	2,50,000
Share premium	20,000	26,000
Profit & loss a/c	104000	134000
12% debentures	70000	64000
Creditors	38000	46000
Bills Payable	5000	4000
Provision for tax	10000	12000
Dividend Payable	7000	8000
	574000	**654000**

Assets	*1999*	*2000*
	$	*$*
Machinery	*2,00,000*	*2,30,000*
Buildings	*1,50,000*	*1, 76,000*
Land	*18,000*	*18,000*
Cash	*42,000*	*32,000*
Debtors	*38,000*	*38,000*
Bills receivable	*42,000*	*62,000*
Stock	*84,000*	*98,000*
	5,74,000	*6,54,000*

Solution:

Fund Flow Statement

Particulars	*Amount*	*Particulars*	*Amount*
$		*$*	
Issue of preference shares	10,000	Purchase of machinery	30,000
Issue of Equity shares	30,000	Purchase of Building	26,000
Share premium received	6,000	Increase in working capital	14,000
Fund from operation	30,000	Redemption of debenture	6,000
76,000		76,000	

Workings: (i) Statement of changes in working capital

	1999	*2000*
	$	*$*
Current Assets :		
Cash	42,000	32,000
Debtors	38,000	38,000
Bills receivables	42,000	62,000
Stock	84,000	98,000
Total current assets	2, 06,000	2, 30,000
Current Liabilities :		
Creditors	38,000	46,000
Bills payable	5,000	4,000
Provision for Tax	10,000	12,000
Dividend payable	7,000	8,000
Total current liabilities	60,000	70,000
Working capital	1,46,000	1,60,000

Increase in working capital : $ 14000 (1,46,000 – 1,60,000)

[Transfer to Fund Flow Statement]

(ii) **Profit and Loss Account**

To Balance b/d (closing)	1,34,000	By Balance c/d	1,40,000
		By Fund from operation	30,000
1,34,000		1,34,000	

2. From the following balance sheets, let us prepare schedule of changes in working

capital.

Liabilities	Dec 1980	Dec1981	Assets	Dec1980	Dec1981
	$	$		$	$
Share capital	2,00,000	2,50,000	Cash	30,000	47,000
Creditors	70,000	45,000	Debtors	1,20,000	1,15,000
Retained}			Land	50,000	66,000
Earnings	10,000	23,000	Stock	80,000	90,000
	2,80,000	3,18,000		2,80,000	3,18,000

Solution:

Fund flow statement

Source of funds	$	Application of fund	$
Issue of shares	50,000	Purchase of land	16,000
Fund from operation	13,000	Increase in working capital	47,000
	63,000		63,000

Workings: (i) Statement of changes in working capital

Current assets	Dec.1980 $	Dec.1981 $
Cash	30,000	47,000
Debtors	1,20,000	1,15,000
Stock	80,000	90,000
Total current assets	2,30,000	2,52,000

Current liabilities		
Creditors	70,000	45,000
Total current liabilities	70,000	45,000
Working capital	1,60,000	2,07,000
Increase in working capital	(1,60,000 - 2,07,000)	47,000

(ii) Profit and Loss Accounts

To Balance b/d	23,000	By Balance C/D	10,000
By Fund from operation (B/f)	13,000		
23,000		23,000	

3. Let us calculate Fund from Operations from the following Profit and Loss Account

To Salaries	45,000	By Gross Profit b/d	2,00,000
To Rent & Rates	15,000	By Profit on Sale of Plant	10,000
To Office Expenses	15,000	By Dividend received on Investment	4,000
To Administrative Expenses	20,000	By Preliminary Expenses	2,000
To General Expenses	5,000	By Transfer to General Reserve	4,000
To Depreciation on Machinery	25,000		
To Depletion of Natural Resources	10,000		
To Depreciation on Building	5,000		
To Loss on Sale of Building	10,000		
To Good will Written off	10,000		
To Discount Written off	3,000		
To Advertisement Written off	5,000		
To Net Profit	52,000		
	2,20,000		2,20,000

Solution:

Calculation of Fund from Operations

Particulars	Amount Rs	Amount Rs.
Net Profit or Retained Earnings (Closing Balance of Profit & Loss A/c)		52,000
Add : **Non-fund or Non-Trading items already debited to P & L A/c :**		
Depreciation on Plant & Machinery	25,000	
Depreciation on Building	5,000	
Depletion of Natural Resources	10,000	
Loss on Sale of Building	10,000	
Good will Written off	10,000	
Discount Written off	3,000	
Advertisement Written off	5,000	
Preliminary Expenses	2,000	70,000
		1,22,000
Less : **Non-Fund or Non-Operating items already credited to P & L A/c :**		
Profit on Sale of Plant	10,000	
Dividend received on Investment	4,000	
Transfer to General Reserve	4,000	18,000
Fund From Operations		1,04,000

Alternatively

Adjusted Profit & Loss Account

Particulars	Amount Rs.	Particulars	Amount Rs.
To Depreciation on Plant and Machinery	25,000	By Profit on Sale of Plant	10,000
To Depreciation on Building	5,000	By Dividend received on Investment	4,000
To Depletion of Natural Resources	10,000	By Transfer to General Reserve	4,000
To Loss on Sale of Building	10,000	By Fund from Operations (Balancing figure)	1,04,000
To Good will Written off	10,000		
To Discount Written off	3,000		
To Advertisement Written off	5,000		
To Preliminary Expenses	2,000		
To Net Profit (Closing Balance)	52,000		
	1,22,000		1,22,000

4. From the following Balance sheet of William & Co. Ltd., we are required to prepare a schedule of changes in working capital and statement of sources and application of funds.

Balance sheet:

Liabilities	2002 Rs.	2003 Rs.	Assets	2002 Rs.	2003 Rs.
Capital	80,000	85,000	Cash in Hand	4,000	9,000
P & L A/c	14,500	24,500	Sundry Debtors	16,500	19,500
Sundry Creditors	9,000	5,000	Stock	9,000	7,000
Long-Term Loans	—	5,000	Machinery	24,000	34,000
			Building	50,000	50,000
	1,03,500	1,19,500		1,03,500	1,19,500

Solution:

Schedule of changes in working capital

Particulars	2002 Rs.	2003 Rs.	Changes in Working Capital	
			Increase	Decrease
Current Assets :				
Cash at Bank	4,000	9,000	5,000	—
Sundry Debtors	16,500	19,500	3,000	—
Stock	9,000	7,000	—	2,000
Total (A)	29,500	35,500		
Current Liabilities :				
Sundry Creditors	9,000	5,000	4,000	—
Total (B)	9,000	5,000		
Working Capital (Total A – B)	20,500	30,500		
Net Increase in Working Capital	10,000	—	—	10,000
	30,500	30,500	12,000	12,000

Fund Flow Statement

Sources of Fund	Rs.	Application of Fund	Rs.
Issue of Capital (80000 – 85000)	5,000	Purchase of Machinery (24,000 – 34,000)	10,000
Long-Term Loans	5,000	Net Increase in	
Fund From Operations (14,500 – 24,500)	10,000	Working Capital	10,000
	20,000		20,000

5. From the following Balance sheet of RR & Co. Ltd., we are required to prepare (a) Schedule of Changes in Working Capital (b) Fund Flow Statement and (c) Fund From Operations.

Balance Sheet

Liabilities	2002 Rs.	2003 Rs.	Assets	2002 Rs.	2003 Rs.
Equity Capital	1,00,000	1,00,000	Good Will	6,000	6,000
General Reserve	14,000	18,000	Patents	6,000	6,000
Profit & Loss A/c	16,000	13,000	Building	50,000	46,000
Bank Overdraft	3,000	2,000	Machinery	27,000	26,000
Sundry Creditors	5,000	3,400	Investments	10,000	11,000
Bills Payable	1,200	800	Stock	20,000	13,400
Provision for Taxation	10,000	11,000	Bills Receivable	12,000	13,200
Proposed Dividend	6,000	7,000	Debtors	18,000	19,000
Provision for Doubtful Debts	400	600	Cash at Bank	6,600	15,200
	1,55,600	1,55,800		1,55,600	1,55,800

Additional Information

1. Depreciation Charged on Machinery Rs. 4,000 and on Building Rs. 4,000.

2. Provision for Taxation of Rs. 19,000 was made during the year 2003.

3. Interim Dividend of Rs. 8,000 was Paid during the year 2003.

Solution:

Calculation of Fund from Operations

Particulars	*Amount Rs.*	*Amount Rs.*
Profit and Loss A/c (Closing Balance of 2003)		13,000
Add : Non-Fund or Non-Trading items already Debited to P&L A/c :		
Depreciation on Machinery	4,000	
Depreciation on Building	4,000	
Interim Dividend Paid	8,000	
Transfer to General Reserve	4,000	

Particulars	*Amount*	*Amount*
Provision for Tax (See Note 1)	19,000	
Proposed Dividend	1,000	40,000
		53,000
Less : Non-Fund or Non-Trading items already Credited to P&L A/c :		
Profit and Loss A/c (Opening balance as per 2002)		16,000
Fund From Operations		37,000

Schedule of Changes in Working Capital

Particulars	*2002*	*2003*	*Changes in Working Capital*	
	Rs.	*Rs.*	*Increase*	*Decrease*
Current Assets :				
Cash at Bank	6,600	15,200	8,600	—
Debtors	18,000	19,000	1,000	—
Stock	20,000	13,400	—	6,600
Bills Receivable	12,000	13,200	1,200	—
Total (A)	56,600	60,800		
Current Liabilities :				
Bank Overdraft	3,000	2,000	1,000	—
Sundry Creditors	5,000	3,400	1,600	—
Provision for Doubtful Debits	400	600	—	200
Bills Payable	1,200	800	400	—
Total (B)	9,600	6,800		
Working Capital (Total A – B)	47,000	54,000		
Net Increase in Working Capital	7,000	—	—	7,000
	54,000	54,000	13,800	13,800

Fund Flow Statement

Sources of Fund	*Rs.*	*Application of Funds*	*Rs.*
Fund From Operations	37,000	Purchase of Machinery	3,000
		Tax Paid (see Note 3)	18,000
		Investment Purchased (10,000 – 11,000)	1,000
		Interim Dividend Paid	8,000
		Net Increase in Working Capital	7,000
	37,000		37,000

Machinery Account

To Balance b/d	27,000	By Depreciation	4,000
To Bank (Purchase of Machinery balancing figure)	3,000	By Balance c/d	26,000
	30,000		30,000

Building Account

To Balance b/d	50,000	By Depreciation	4,000
		By Balance c/d	46,000
	50,000		50,000

Provision for Taxation

To Bank (Balancing figure)	18,000	By Balance b/d	10,000
		By Provision for Taxation	19,000
To Balance c/d	11,000		
	29,000		29,000

6. From the following comparative Balance Sheet of Gupta & Co., we are required to prepare (a) Schedule of Changes in Working Capital (b) Fund Flow Statement and (c) Fund From Operations.

Balance Sheet

Liabilities	*2002 Rs.*	*2003 Rs.*	*Assets*	*2002 Rs.*	*2003 Rs.*
Share Capital	90,000	1,00,000	Goodwill	12,000	10,000
General Reserve	14,000	18,000	Buildings	40,000	36,000
Profit & Loss A/c	19,500	12,000	Machinery	37,000	36,000
Provision for Taxation	16,000	17,000	Stock	30,000	25,400
Sundry Creditors	8,000	5,400	Sundry Debtors	20,000	22,200
Bills Payable	6,200	1,300	Cash at Bank	6,600	15,200
Provision for Doubtful Debts	1,900	2,100	Investments	10,000	11,000
	1,55,600	1,55,800		1,55,600	1,55,800

Additional Information

(1) Depreciation charged on Machinery was Rs. 4000 and on building Rs. 4000.

(2) Interim Dividend paid during 2003 was Rs. 7500.

(3) (3) Provision of Rs. 5000 was made for taxation during the 2003.

Solution:

Particulars	*Rs.*	*Rs.*
Net Profit (Closing Balance)		12,000
Add : Non-fund or Non-operating items		
Which already Debited to P & L A/c :		
Good Will Written off	2,000	
Depreciation on Machinery	4,000	
Depreciation on Building	4,000	
Interim Dividend Paid	7,500	

Calculation of Fund From Operations

Particulars	*Rs.*	*Rs.*
Transfer to General Reserve	4,000	21,500
		33,500
Less : Non-Fund or Non Operating items already Credited to P & L A/c : Net Profit (Opening Balance)		19,500
Fund From Operations		14,000

Schedule of Changes in Working Capital

Particulars	*2002*	*2003*	*Changes in Working Capital*	
	Rs.	*Rs.*	*Increase*	*Decrease*
Current Assets :				
Stock	30,000	25,400	—	4,600
Sundry Debtors (*Less:* Provision For Doubtful Debts)	18,100	20,100	2,000	
Cash Balances	6,600	15,200	8,600	—
Total (A)	54,700	60,700		
Current Liabilities :				
Sundry Creditors	8,000	5,400	2,600	—
Bills Payable	6,200	1,300	4,900	—
Prevention for Tax	16,000	17,000	—	1,000
Total (B)	30,200	23,700		
Working Capital (Total A – B)	24,500	37,000		
Net Increase in Working Capital	12,500	—	—	12,500
	37,000	37,000	18,100	18,100

Fund Flow Statement

Sources of Funds	*Rs.*	*Application of Funds*	*Rs.*
Issue of Share Capital (90,000 – 1,00,000)	10,000	Purchase of Machinery	3,000
		Purchase of Investments	1,000
Funds From Operations	14,000	Interim Dividend Paid	7,500
		Net Increase in Working Capital	12,500
	24,000		24,000

Machinery Account

To Balance b/d	37,000	By Depreciation	4,000
To Bank (Purchase of Machinery Balancing figure)	3,000	By Balance c/d	36,000
	40,000		40,000

Building Account

To Balance b/d	40,000	By Depreciation	4,000
		By Balance c/d	36,000
	40,000		40,000

6

CAPITAL AND CAPITAL BUDGETING

Capital Budgeting: Meaning of Capital-Capitalization-Meaning of Capital Budgeting-Time value of money- Methods of appraising Project profitability: Traditional Methods(pay back period, accounting rate of return) and modern methods(Discounted cash flow method, Net Present Value method, Internal Rate of Return Method and Profitability Index).

6.1 Capital Budgeting - Meaning of Capital-Capitalization - Meaning of Capital Budgeting - Time value of money

Capital budgeting is also known as investment appraisal. It is the process by which a company determines whether projects are worth pursuing. The projects may be of investing in R&D, opening a new branch, replacing a machine etc. A project is worth pursuing if it increases the value of the company.

- Cost of acquisition of permanent asset like land and building, plant and machinery, goodwill.
- Cost of replacement of permanent assets.
- Cost of addition, expansion and improvement or alteration in fixed assets.
- Research and development project cost etc.

Capital budgeting is investment decision-making as to whether a project is worth undertaking. Capital budgeting is normally concerned with the justification of capital expenditures.

Current expenditures are short-term and are completely written off in the same year that expenses occur. Capital expenditures are long-term and are amortized over a period of years are required by the IRS.

The mobilization and investment of funds are the two major tasks that the management has to perform in any organization. The source mix, the size of the capital expenditure budget and the pattern of investments made will decide, to a considerable extent, what an organization is and what it will be. It is therefore not surprising that these problems have received considerable attention.

The planning of capital structure (source mix) and the relative allocation of funds to different projects are interrelated problems in the long run. The source mix determines the cost of raising the

funds and the obligations towards repayment thereby determining the type of projects that can be considered for investment.

Investment is the economic activity of committing a set of resources with the expectation of receiving a stream of benefits in the future. In current managerial practice, if the time horizon over which benefits accrue is longer than one year, then the resources committed are called 'investment' and the money spent is termed as 'capital expenditures'.

Capital expenditure can be of two types,

(i) Expenditure increasing revenue. Such expenditure brings more revenue to the firm either by expansion of present operations or development of a new product line.

(ii) Expenditure reducing cost. Such a capital expenditure reduces the total cost and thereby adds to the total earnings of the firm.

Capital Budgeting Decisions

A business concern has to face the problem of capital investment decisions. Capital investment refers to the investment in projects whose results would be available only after a year. The following are some of the cases where heavy capital investment may be necessary,

Replacement: Replacement of fixed assets may become necessary either on account of their being worn out or becoming outdated on account of new technology.

Expansion: A firm may have to expand its production capacity on account of more demand for its product and inadequate production capacity.

Diversification: Firm may decide to produce more than one line of products or to operate in several markets rather than in a single market with the purpose of reducing risk or earning higher contribution and sustained growth. In such a case, capital investment may become necessary for purchase of new machinery and other resources to handle the new products.

Research and Development: In some industries, technology changes rapidly, while in other industries, the change in technology takes some time. Huge amount is required for those organizations where technology is rapidly changing.

Miscellaneous: A firm may have to invest money in projects which do not directly help in achieving profit-oriented goals. For example, these projects help in improving working conditions, pollution control and provision of safety. Though such projects do not directly help in earning profit, these become desirable for their long-term impact on the goodwill of the firm.

6.1.1 Meaning of Capital-Capitalization

Capitalization is the recordation of a cost as an asset, rather than an expense. This approach is used when cost is not expected to be entirely consumed in the current period, but rather over an

extended period of time. For example, office supplies are expected to be consumed in the near future, so they are charged to expense at once.

An automobile is recorded as a fixed asset and charged to expense over a much longer period through depreciation, since the vehicle will be consumed over a longer period of time than office supplies.

Capitalization is also based on the concept of materiality. If a cost of a good is too small, it is charged to expense at once, rather than bothering with a series of accounting calculations and journal entries to capitalize it and then gradually charge it to expense over time.

The specific dollar amount below which items are automatically charged to expense is called the capitalization limit or cap limit. The capital limit is used to keep record by keeping down to a manageable level, while still capitalizing the bulk of all items that should be designated as fixed assets.

It is used heavily in asset-intensive environments, such as manufacturing, where depreciation can be a large part of total expenses. Conversely, capitalization might be extremely rare in a services industry, especially when the cap limit is set high enough to avoid the recordation of personal computers and laptops as fixed assets.

If a company makes fixed assets, the interest cost of any borrowed funds used to pay for the construction can also be capitalized and recorded as part of the underlying fixed assets. This step is taken for substantial construction projects.

Capitalization can be used as a tool to commit financial statement reporting fraud. If costs are capitalized that should have been charged to expense, current income is inflated, at the expense of future periods over which additional depreciation will now be charged. This practice can be spotted by comparing cash flows to net income, cash flows should be substantially lower than net income.

The "capitalization" term also refers to the market value of a business. It is determined as the total number of shares outstanding, multiplied by the current market price of the stock.

6.1.2 Meaning of Capital Budgeting

Capital budgeting is a process used by firms for evaluating and ranking potential expenditures or investments that are significant in amount. The large expenditures could include the purchase of new equipment, purchasing delivery vehicles, rebuilding existing equipment, constructing additions to buildings, etc. The large amounts spent for these types of projects are known as capital expenditures.

Capital budgeting usually involves the determination of each project's future accounting profit by period, the cash flow by period, the present value of the cash flows after considering the time value of money, the number of years it takes for a project's cash flow to pay back the initial cash investment, an assessment of risk and other factors.

Capital budgeting is a tool for maximizing a company's future profits since most companies are able to manage only a limited number of large projects at one time.

Capital budgeting is the most important and complicated problem of managerial decisions. It is concerned with designing and carrying out through a systematic investment programme. It involves the planning of such expenditures which provide yields over a number of years.

Under capital budgeting, proposed capital expenditures and their financing are considered and projects assuring the most profitable use of given resources are undertaken. Capital budgeting may be defined as the rational allocation of a firm's scarce resources among the competing investment opportunities with a view to maximize the market value of the firm in the long run.

Importance of Capital Budgeting

Capital budgeting decisions are the most crucial and critical business decisions. Investment decisions require special attention because of the following reasons,

Involvement of Heavy Funds:

Capital budgeting decisions require large capital outlays which make it imperative for the firm to plan its investment programmes very carefully so that it may get the finances at the right time and they are put to most profitable use. A correct decision can give progressive results while incorrect decision can affect the survival of the firm.

Long-term Implications: The effect of capital budgeting decisions will be felt by the firm over a long period and therefore they have a decisive influence on the rate and direction of the growth of the firm.

Irreversible Decisions: In most cases, capital budgeting decisions are irreversible. This is because it is very difficult to find a market for the capital assets. The only alternative will be to scrap the capital assets so purchased or sell them at a substantial loss in the event of the decision being proved wrong.

Most Difficult to Make: The capital budgeting decisions are among the firm's most difficult decisions. It requires an assessment of future events which are uncertain. It is really a complex task to correctly estimate future cash flows of an investment. The cash flow uncertainty is caused by economic, political, social and technological factors.

6.1.3 Time value of money

The time value of money (TVM) is the concept that money available at the present time is worth more than the identical sum in the future due to its potential earning capacity. This core principle of finance holds that, provided money can earn interest, any amount of money is worth more the sooner it is received. TVM is also sometimes referred to as present discounted value.

One reason is that money received today can be invested thus generating more money. Another reason is that when a person opts to receive a sum of money in future rather than today, he is effectively lending the money and there are risks involved in lending such as default risk and inflation. Default risk arises when the borrower does not pay the money back to the lender. Inflation is the rise in general level of prices.

Time value of money principle also applies when comparing the worth of money to be received in future and the worth of money to be received in further future. In other words, TVM principle says that the value of given sum of money to be received on a particular date is more than same sum of money to be received on a later date.

Breaking Down 'Time Value of Money - TVM'

The time value of money draws from the idea that rational investors prefer to receive money today rather than the same amount of money in the future because of money's potential to grow in value over a given period of time. For example, money deposited into a savings account earns a certain interest rate and is therefore said to be compounding in value.

Further illustrating the rational investor's preference, assume we have the option to choose between receiving Rs. 10,000 now versus Rs. 10,000 in two years. It is reasonable to assume most people would choose the first option.

Despite the equal value at time of disbursement, receiving the Rs. 10,000 today has more value and utility to the beneficiary than receiving it in the future due to the opportunity costs associated with the wait. Such opportunity costs could include the potential gain on interest earned for money received today and held in a savings account for two years.

Basic Time Value of Money Formula

Depending on the exact situation in question, the TVM formula may change slightly. For example, in the case of annuity or perpetuity payments, the generalized formula has additional or less factors. But in general, the most fundamental TVM formula takes into account the following variables,

- FV = Future value of money
- PV = Present value of money
- i = Interest rate
- n = Number of compounding periods per year
- t = Number of years

Based on these variables, the formula for TVM is,

$$FV = PV \times [\, 1 + (i / n) \,]^{(n \times t)}$$

Time Value of Money Example

Let us assume a sum of Rs. 10,000 is invested for one year at 10% interest. The future value of that money is,

FV = Rs. 10,000 x (1 + (10% / 1) ^ (1 x 1) = Rs. 11,000

The formula can also be rearranged to find the value of the future sum in present day dollars. For example, the value of Rs. 5,000 one year from today, compounded at 7% interest, is,

PV = Rs. 5,000 / (1 + (7% / 1) ^ (1 x 1) = Rs. 4,673

Effect of Compounding Periods on Future Value

The number of compounding periods can have a drastic effect on the TVM calculations. Taking the Rs. 10,000 example above, if the number of compounding periods is increased to quarterly, monthly or daily, the ending future value calculations are,

- **Quarterly Compounding:**

FV = Rs. 10,000 x (1 + (10% / 4) ^ (4 x 1) = Rs. 11,038

- **Monthly Compounding:**

FV = Rs. 10,000 x (1 + (10% / 12) ^ (12 x 1) = Rs. 11,047

- **Daily Compounding:**

FV = Rs. 10,000 x (1 + (10% / 365) ^ (365 x 1) = Rs. 11,052

This shows TVM depends not only on interest rate and time horizon, but also on how many times the compounding calculations are computed each year.

Application of Time Value of Money Principle:

There are many applications of time value of money principle. For example, we can use it to compare the worth of cash flows occurring at different times in future, to find the present worth of a series of payments to be received periodically in future, to find the required amount of current investment that must be made at a given interest rate to generate a required future cash flow, etc.

6.2 Methods of appraising Project profitability - Traditional Approach - Modern methods

Project appraisal methodologies are methods used to access a proposed project's potential success and viability. These methods check the appropriateness of a project considering things such as available funds and the economic climate. A good project will service debt and maximize shareholder's wealth.

Some of the methods of project appraisal are as follows,

1. Economic Analysis:

Under economic analysis, the project aspects highlighted include requirements for raw material, level of capacity utilization, anticipated sales, anticipated expenses and the probable profits. It is said that a business should have always a volume of profit clearly in view which will govern other economic variables like sales, purchases, expenses and alike.

It will have to be calculated how much sales would be necessary to earn the targeted profit. Undoubtedly, demand for the product will be estimated for anticipating sales volume. Therefore, demand for the product needs to be carefully spelled out as it is, to a great extent, deciding factor of feasibility of the project concern.

In addition to above, the location of the enterprise decided after considering a gamut of points also needs to be mentioned in the project. The Government policies in this regard should be taken into consideration. The Government offers specific incentives and concessions for setting up industries in notified backward areas.

Therefore, it has to be ascertained whether the proposed enterprise comes under this category or not and whether the Government has already decided any specific location for this kind of enterprise.

2. Financial Analysis:

Finance is one of the most important pre-requisites to establish an enterprise. It is only finance that facilitates an entrepreneur to bring together the labour of one, machine of another and raw material of yet another to combine them to produce goods.

In order to adjudge the financial viability of the project, the following aspects need to be carefully analyzed,

(i) Assessment of the financial requirements both – fixed capital and working capital need to be properly made. We might be knowing that fixed capital normally called 'fixed assets' are those tangible and material facilities which purchased once are used again and again. Land and buildings, plants and machinery and equipments are the familiar examples of fixed assets/fixed capital.

The requirement for fixed assets/capital will vary from enterprise to enterprise depending upon the type of operation, scale of operation and time when the investment is made. But, while assessing the fixed capital requirements, all items relating to the asset like the cost of the asset, architect and engineer's fees, electrification and installation charges (which normally come to 10 percent of the

value of machinery), depreciation, pre-operation expenses of trial runs, etc., should be duly taken into consideration. Similarly, if any expense is to be incurred in remodeling, repair and additions of buildings should also be highlighted in the project report.

(ii) In accounting, working capital means excess of current assets over current liabilities. Generally, 2:1 is considered as the optimum current ratio. Current assets refer to those assets which can be converted into cash within a period of one week.

Current liabilities refer to those obligations which can be payable within a period of one week. In short, working capital is that amount of funds which is needed in day today's business operations. In other words, it is like circulating money changing from cash to inventories and from inventories to receivables and again converted into cash.

This circle goes on and on. Thus, working capital serves as a lubricant for any enterprise, be it large or small. Therefore, the requirements of working capital should be clearly provided for. Inadequacy of working capital may not only adversely affect the operation of the enterprise but also bring the enterprise to a grinding halt.

The activity level of an enterprise expressed as capacity utilization, needs to be well spent in the business plan or project report. However, the enterprise sometimes fails to achieve the targeted level of capacity due to various business vicissitudes like unforeseen shortage of raw material, unexpected disruption in power supply, inability to penetrate the market mechanism, etc.

Then, a question arises to what extent enterprise should continue its production to meet all its obligations/liabilities. 'Break-even analysis' (BEP) gives an answer to it. In brief, break-even analysis indicates the level of production at which there is neither profit nor loss in the enterprise. This level of production is, accordingly, called 'break-even level'.

3. Market Analysis:

Before the production actually starts, the entrepreneur needs to anticipate the possible market for the product. He/she has to anticipate who will be the possible customers for his product and where and when his product will be sold. There is a trite saying in this regard: "The manufacturer of an iron nails must know who will buy his iron nails."

This is because production has no value for the producer unless it is sold. It is said that if the proof of pudding lies in eating, the proof of all production lies in marketing/ consumption. In fact, the potential of the market constitutes the determinant of probable rewards from entrepreneurial career.

Thus, knowing the anticipated market for the product to be produced becomes an important element in every business plan. The various methods used to anticipate the potential market, what is named in 'Managerial Economics' as 'demand forecasting', range from the naive to sophisticated ones.

The commonly used methods to estimate the demand for a product are as follows,

1. Opinion Polling Method:

In this method, the opinions of the ultimate users, i.e., customers of the product are estimated. This may be attempted with the help of either a complete survey of all customers (called, complete enumeration) or by selecting a few consuming units out of the relevant population (called, sample survey).

Let us see in detail,

(a) Complete Enumeration Survey:

In this survey, all the probable customers of the product are approached and their probable demands for the product are estimated and then summed. Estimating sales under this method is very simple. It is obtained by simply adding the probable demands of all customers.

Suppose, there are total N customers of X product and everybody will demand for D numbers of it.

Then, the total anticipated demand will be,

$N \sum i=1 D_iN$

Though the principle merit of this method is that it obtains the first-hand and unbiased information, yet it is beset with some disadvantages also.

For example, to approach a large number of customers scattered all over market becomes tedious, costly and cumbersome. Added to this, the consumers themselves may not divulge their purchase plans due to the reasons like their personal as well commercial/business privacies.

(b) Sample Survey:

Under this method, only some number of consumers out of their total population is approached and data on their probable demands for the product during the forecast period are collected and summed. The total demand of sample customers is finally blown up to generate the total demand for the product. Let this also be explained with an example.

Imagine, there are 1000 customers of a product spread over the Faridabad market. Out of these, 50 are selected for survey using stratified method. Now, if the estimated demand of these sample customers is D_i, i.e., it refers to 1 2 3….50, the total demand for the entire group of customers will be,

$50 \sum n_i D_i = n_1 D_1 + n_2D_2 + n_3 D_3 ..... n_{50} D_{50}$

where n, is the number of customers in group i and $n_1 + n_2 + n_3....n_{50} = 1000$

But, if all the 1000 customers of the group are alike, then the selection may be done on a random basis and total demand for the group will be,

$(D_1 + D_2 + D_3 + D_4 \ldots D_5)$ 1000 /50

No doubt, survey method is less costly and tedious than the complete enumeration method.

(c) Sales Experience Method:

Under this method, a sample market is surveyed before the new product is offered for sale. The results of the market surveyed are then projected to the universe in order to anticipate the total demand for the product.

In principle, the survey market should be the true representative of the national market which is not always true. Suppose, if Delhi is selected as a sample market, it may not be a true representative of a small place, say Silchar in Assam simply because the characteristic features of Delhi are altogether different from those of a small town like Silchar.

Again, if we select Agra as a sample market, sales in Agra would be influenced by the size of the floating tourist's population throughout the year. But this feature is not experienced by many other places again like Silchar in Assam.

(d) Vicarious Method:

Under the vicarious method, the consumers of the product are not approached directly but indirectly through some dealers who have a feel of their customers. The dealers' opinions about the customer's opinion are elicited.

Being based on dealer's opinions, the method is bound to suffer from the bias on the part of the dealers. Then, the results derived are likely to be unrealistic. However, these hang-ups are not avoidable also.

2. Life Cycle Segmentation Analysis:

It is well established that like a man, every product has its own life span. In practice, a product sells slowly in the beginning. Backed by sales promotion strategies over period, its sales pick up. In the due course of time, the peak sale is reached.

After that point, the sales begin to decline. After, some time, the product loses its demand and dies. This is natural death of a product. Thus, every product passes through its 'life cycle'. This is precisely the reason why firms go for new products one after another to keep themselves alive.

Based on above, the product life cycle has been divided into the following five stages,

1. Introduction

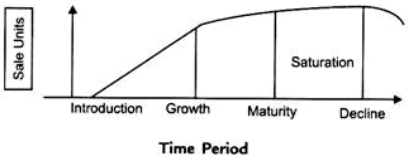
2. Growth

3. Maturity

4. Saturation

5. Decline

The sales of the product vary from stage to stage and follows S-shaped curve as shown in the below figure.



Product Life-Cycle

By considering the above five stages of a product life cycle, the sales at different stages can be anticipated.

4. Technical Feasibility:

While making project appraisal, the technical feasibility of the project also needs to be taken into consideration. In the simplest sense, technical feasibility implies to mean the adequacy of the proposed plant and equipment to produce the product within the prescribed norms. As regards know-how, it denotes the availability or otherwise of a fund of knowledge to run the proposed plants and machinery.

It should be ensured whether that know-how is available with the entrepreneur or is to be procured from elsewhere. In the latter case, arrangement made to procure it should be clearly checked up. If project requires any collaboration, then, the terms and conditions of the collaboration should also be expressed out comprehensively and carefully.

In case of foreign technical collaboration, one needs to be aware of the legal provisions in force from time to time specifying the list of products for which only such collaboration is allowed under specific terms and conditions. The entrepreneur, therefore, contemplating for foreign collaboration should check these legal provisions with reference to their projects.

While assessing the technical feasibility of the project, the following inputs covered in the project should also be taken into consideration:

(i) Availability of land and site.

(ii) Availability of other inputs like water, power, transport, communication facilities.

(iii) Availability of servicing facilities like machine shops, electric repair shop, etc.

(iv) Coping-with anti-pollution law.

(v) Availability of work force as per required skill and arrangements proposed for training-in-plant and outside.

(vi) Availability of required raw material as per quantity and quality.

5. Management Competence:

Management ability or competence plays an important role in making an enterprise a success or otherwise. In the absence of managerial competence, the projects which are otherwise feasible may fail.

On the contrary, even a poor project may become a successful one with good managerial ability. Hence, while doing project appraisal, the managerial competence or talent of the promoter should be taken into consideration.

Research studies report that most of the enterprises fall sick because of lack of managerial competence or mismanagement. This is more so in case of small-scale enterprises where the proprietor is all in all, i.e., owner as well as manager. Due to his one-man show, he may be jack of all but master of none.

Included in the methods of appraising an investment proposal are those which are objective, quantified and best on economic costs and benefits.

The methods of appraising capital expenditure proposals can be classified into two broad categories,

(i) tradition

(ii) time-adjusted

The latter are more popularly known as discounted cash flow (DCF) techniques as they take the time factor into account. The first category includes (i) average rate of return method and (ii) pay back period method.

The second category includes (i) net present value method, (ii) internal rate of return method, (iii) net terminal value method and (iv) profitability index.

6.2.1 Traditional Approach

(i) Average Rate of Return/Accounting Rate of Return

Computation: The average rate of return (ARR) method of evaluating proposed capital expenditure is also known as the account rate of return method. It is based upon accounting information rather than cash flows.

There is no unanimity regarding the definition of the rate of return. There are a number of alternative methods for calculating the ARR. The most common usage of the average rate of return (ARR) is expressed as follows,

$$ARR = \frac{Average\ annual\ profits\ after\ taxes}{Average\ investment\ over\ the\ life\ of\ the\ project} \times 100$$

The average profits after taxes are determined by adding up the after-tax profits expected for each year of the project's life and dividing the result by the number of years. In the case of annuity, the average after-tax profits are equal to any year's profits. The average investment is determined by dividing the net investment by two.

This averaging process assumes that the firm is using straight line depreciation, in which case the book value of the asset declines at a constant rate from its purchase price to zero at the end of its depreciable life. This means that, on the average, firms will have one-half of their initial purchase price in the books.

Consequently, if the machine has salvage value, then only the depreciable cost (cost-salvage value) of the machine should be divided by two in order to ascertain the average net investment, as the salvage money will be recovered only at the end of the life of the project. Therefore, an amount equivalent to the salvage value remains tied up in the project throughout its life time.

Hence, no adjustment is required to the sum of salvage value to determine the average investment. Likewise, if any additional net working capital is required in the initial year which is likely to be released only at the end of the project's life, the full amount of working capital should be taken in determining relevant investment for the purpose of calculating ARR.

Thus,

Average investment = Net working capital + Salvage value + 1/2 (Initial cost of machine- Salvage value)

For instance, given the information: initial investment (purchase of machine), Rs. 11,000, salvage value, Rs. 1,000, working capital, Rs. 2,000 services life (years) S and that the straight line method of

depredation is adopted, the average investment is, Rs. 1,000 + Rs. 2,000 + 1/2 (Rs. 11,000 - Rs. 1,000) a Rs. 8,000.

(ii) Payback period Computation

The pay back method (PB) is the second traditional method of capital budgeting. It is the simplest and, perhaps, the most widely employed, quantitative method for appraising capital expenditure decisions.

This method answers the question: How many years will it take for the cash benefits to pay the original cost of an investment, normally disregarding salvage value? Cash benefits here represent CFAT ignoring interest payment.

Thus, the pay back method (PB) measures the number of years required for the CFAT to pay back the original outlay required in an investment proposal. There are two ways of calculating the PB period.

The first method can be applied when the cash flow stream is in the nature of annuity for each year of the project's life, that is, CFAT are uniform. In such a situation, the initial cost of the investment is divided by the constant annual cash flow.

$$PB = \frac{Investment}{Const.annual\ cash\ \ flow}$$

For example an investment of Rs. 40,000 in a machine is expected to produced CFAT of Rs.8,000 for 10 years,

$$PB = \frac{Rs.40,000}{Rs.8,000} = 5 \text{ years}$$

The second method is used when a project's cash flows are not uniform (mixed stream) but vary from year to year. In such a situation, PB is calculated by the process of cumulating cash flows till the time when cumulative cash flows become equal to the original investment outlay. Below table presents the calculations of pay back period for example.

Year	**Annual CFAT**		**Cumulative CFAT**	
	A	**B**	**A**	**B**
1	14,000	22,000	14,000	22,000

2	16,000	20,000	30,000	42,000
3	18,000	18,000	48,000	60,000
4	20,000	16,000	68,000	76,000
5	25,000	17,000	93,000	93,000

• CFAT in the fifth year includes Rs. 3,000 salvage value also.

The initial investment of Rs. 56,125 on machine A will be recovered between years 3 and 4. The pay back period would be a fraction more than 3 years. The sum of Rs. 48,000 is recovered by the end of the third year.

The balance Rs. 8,125 is needed to be recovered in the fourth year. In the fourth year CFAT is Rs. 20,000. The pay back fraction is, therefore, 0.406 (Rs 8,125/Rs 20,000). The pay back period for machine A is 3,406 years.

Similarly, for machine B the pay back period would be 2 year and a fraction of a year. As Rs 42,000 is recovered by the end of the second year, the balance of Rs. 14,125 needs to be recovered in the third year. In the third year CFAT is Rs. 18,000. The pay back fraction is 0.785 (Rs 14,175/Rs 18,000). Thus, the PB period for machine B is 2.785 years.

Accept-Reject Criterion: The pay back period can be used as a decision criterion to accept or reject investment proposals. One application of this technique is to compare the actual pay back with a predetermined pay back, that is, the pay back set up by the management in terms of the maximum period during which the initial investment must be recovered.

If the actual pay back period is less than the predetermined pay back, the project would be accepted; if not, it would be rejected. Alternatively, the pay back can be used as a ranking method. When mutually exclusive projects are under consideration, they may be ranked according to the length of the pay back period.

Thus, the project having the shortest pay back may be assigned rank one, followed in that order so that the project with the longest pay back would be ranked last. Obviously, projects with shorter pay back period will be selected.

Advantages of Pay back period method:

• It saves cost.

• It is easy to calculate, simple to understand.

• A firm having less funds can select the shorter time period for pay back.

Disadvantages of Pay back period method:

• It fails to take in to account cash inflow earned after pay back period.

• It does not take into account salvage value of asset.

(ii) Improvement to traditional approach to pay back method:

(a) Pay back reciprocal method: This method is used to find out the internal rate of return generated by a project. It is used when equal cash inflow is generated every year.

Pay back reciprocal = Annual cash inflow*100/ total investment.

(b) Post pay back profitability method:

The main drawback of pay back method is that it fails to take in to account cash inflow earned after pay back period so true profitability of the project can not be ascertained. An improvement to this method can be done only by taking into account the return received after the pay back period.

Post pay back profitability = Post pay back profit * 100/investment

(c) Discounted pay back method:

The pay back method ignores the time value of money. Discounted pay back method is an improvement over this method. Under this method the present value of all cash inflow and cash outflow is calculated at an appropriate discount rate.

Discounted pay back period is the period at which the present value of cash inflow = present value of cash outflow. The project with the shorter time period is accepted.

(d) Post pay back period method:

The limitation of the pay back method was that it ignores the life of the project beyond the pay back period. But this method takes into account the life of the project beyond the pay back period. Hence, the project which gives the greatest post pay back period is accepted.

(iii) Rate of return method or accounting method:

This method takes into account the earning expected from the investment over their whole life. This accounting method is used as the accounting concept of profit after tax and depreciation.

Decision rule: The project with higher rate of return is accepted and the project with the lower rate of return is rejected.

(a) Average rate of return method: According to this method, average profit after tax and depreciation is calculated and then it is divided by total investment.

Average rate of return = average annual profit after tax and depreciation*100/net investment

(b) Return per unit of investment method: It is slightly different from the above method. According to this method total profit after tax and depreciation is divided by total investment.

Return per unit of investment = total profit after tax and depreciation *100/net investment

(c) Average return on average investment:

It is a good method of finding out rate of return on investment.

Average return on average investment = Average annual profit after tax and depreciation*100/average investment.

Advantages of rate of return method:

• It gives better view of profitability.

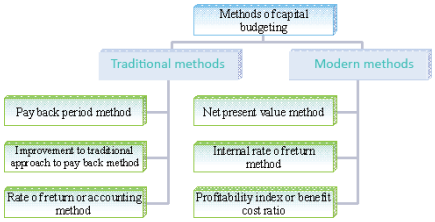
• It is based upon the accounting concept.

• It is easy to calculate, simple to understand.

Disadvantages of rate of return method:

1. It fails to take in account cash flow.

2. It does not take into time value of money.



6.2.2 Modern methods

1. Time adjusted or discounted method:

The main disadvantage of the traditional method is that it gives equal value to the present and future flow of incomes and do not take into consideration the time value of money. A rupee earned today has more value than the rupee earned after 5 years. This method is also called as modern method of capital budgeting.

2. Net present value method:

This method takes into account, the time value of money which means the return on investment is calculated by introducing the time element. This method realizes the concept that a rupee earned today has more value than the rupee earned after five years.

To find net present value the following steps are used:

(a) Let us determine the appropriate rate of interest selected as minimum rate of return or discount rate.

(b) Compute the present value of cash outflow at determined discount rate.

(c) Compute the present value of cash outflow at determined discount rate.

(d) Calculate the net present value of each project by subtracting the present value of cash inflow from the present value of cash outflow.

Decision rule: If the net present value is positive or zero then the project is accepted otherwise rejected.

NPV is + accepted

NPV is zero accepted

NPV is - rejected

The project having maximum positive value is accepted among various proposals.

Present value = $1/ (1+r)^n$

Advantages of net present value method:

1. It takes into account maximum profitability.

2. It gives better view of profitability.

3. It recognizes the time value of money.

Disadvantages of net present value method:

1. It is complex to understand.

2. It is complex to determine the discount rate.

3. Internal rate of return method:

This method is also known as time adjusted rate of return, discounted rate of return, yield method, discounted cash flow, trial and error method. Under this method, cash flow of a project is discounted at a suitable rate by hit and trial method. It is the rate where present value of cash inflow = present value of cash outflow.

To calculate internal rate of return the following steps are used:

(a) Let us determine the future net cash flow.

(b) Let us also determine the discount rate at which cash inflow = cash outflow.

Decision rule:

IRR > minimum required rate of return then accept the proposal

IRR < minimum required rate of return than reject the proposal

IRR = minimum required rate of return than indifferent

Advantages of internal rate of return method:

1. It takes into account maximum profitability.

2. It gives better view of profitability.

3. It recognizes the time value of money.

Disadvantages of internal rate of return method:

1. It is difficult to understand.

2. The result of NPV and IRR differs.

4. Profitability index or benefit cost ratio: It is the relationship between present value of cash inflow and present value of cash outflow.

Profitability index = present value of cash inflow/ present value of cash outflow

Or,

Profitability index = net present value/ initial cash outlay

Net profitability index = profitability index - 1

Decision rule:

If PI > 1 accept the project

If PI < 1 reject the project

If PI = 1 indifferent.

Advantages of profitability index method

1. This method takes into consideration all the requirements of sound investment decisions.

2. It recognizes the time value of money.

Disadvantages of profitability index method

1. It is difficult to understand.

2. This method does not take into account size of investment.

Problems

1. The Delta company is planning to purchase a machine known as machine X. Machine X would cost $25,000 and would have a useful life of 10 years with zero salvage value. The expected annual cash inflow of the machine is $10,000.

Required: Compute payback period of machine X and conclude whether or not the machine would be purchased if the maximum desired payback period of Delta company is 3 years.

Solution:

Since the annual cash inflow is even in this project, we can simply divide the initial investment by the annual cash inflow to compute the payback period. It is shown below:

Payback period = $25,000/$10,000

= 2.5 years

According to payback period analysis, the purchase of machine X is desirable because its payback period is 2.5 years which is shorter than the maximum payback period of the company.

2. Due to increased demand, the management of Rani Beverage Company is considering to purchase a new equipment to increase the production and revenues. The useful life of the equipment is 10 years and the company's maximum desired payback period is 4 years. The inflow and outflow of cash associated with the new equipment is given below:

Initial cost of equipment: $37,500

Annual cash inflows:

Sales: $75,000

Annual cash Outflows:

Cost of ingredients: $45,000

Salaries expenses: $13,500

Maintenance expenses: $1,500

Non cash expenses:

Depreciation expense: $5,000

Required: Should Rani Beverage Company purchase the new equipment? Use payback method for your answer.

Solution:

Step 1: In order to compute the payback period of the equipment, we need to workout the net annual cash inflow by deducting the total of cash outflow from the total of cash inflow associated with the equipment.

Computation of net annual cash inflow:

$75,000 – ($45,000 + $13,500 + $1,500)

= $15,000

Step 2: Now, the amount of investment required to purchase the equipment would be divided by the amount of net annual cash inflow (computed in step 1) to find the payback period of the equipment.

= $37,500/$15,000

=2.5 years

Depreciation is a non-cash expense and has therefore been ignored while calculating the payback period of the project.

According to payback method, the equipment should be purchased because the payback period of the equipment is 2.5 years which is shorter than the maximum desired payback period of 4 years.

3. Let us calculate the average rate of return for Projects X and Y from the following,

	Project X	Project Y
Investments	Rs.40,000	Rs.60,000
Expected Life	4 years	5 years

Projected net income (after interest, depreciation and taxes)

Year	Project X Rs	Project Y Rs
1.	4,000	6,000
2.	3,000	6,000
3.	3,000	4,000
4.	2,000	2,000
5.	——	2,000
	12,000	20,000

Solution:

If the required rate of return is 10% which project should be undertaken?

Average Rate of Return = Original Investment / Average Annual Income X 100

The first step is to find out the average annual income of the two different projects X and Y

Average Annual Income Total income throughout the Project / Life of the Project

Average Annual Income (Project X) = Rs. 12,000 / 4 years = Rs. 3,000

Average Annual Income (Project Y) = Rs. 20,000 / 5 years = Rs. 4,000

The next step is to find out the Average rate of return:

Average rate of return (Project X) = Rs. 3,000 / Rs.40,000 X100 =7.5%

Average rate of return (Project Y) = Rs.5,000/ Rs. 60,000 X 100 = 8.33%

Both the projects are lesser than the given required rate of return.

These two projects are not advisable to invest only due to lesser accounting rate of return

4. Let us calculate the NPV of 2 projects and suggest which of 2 projects should be accepted assuming a discount rate 10%

Particular	**project 'X'**	**project'Y'**

Initial investment	**20000**	**30000**
Estimate life	**5yrs**	**5yrs**
Scrap value	**1000**	**2000**

The profit before dep. & Tax, cash flows are as follows,

Year	**1**	**2**	**3**	**4**	**5**
Project X	**5000**	**10000**	**10000**	**3000**	**2000**
Project Y	**20000**	**10000**	**5000**	**3000**	**2000**

Solution:

Project 'X'

Cash inflow	**PV @ 10%**	**PV of cash inflows**
5000	0.909	4545
10000	0.826	8260
10000	0.751	7510
3000	0.683	2049
2000	0.620	1240

1000(scrap value)	0.620	620
	Total PV of cash inflows	**24224**

NPV = PV cash of inflow - PV of cash outflows

= 24224 - 20000 NPV = 4224

	120000	40000	80000	32000	48000		88000

Project 'Y'

Cash inflow	**PV @ 10%**	**PV of cash inflows**
20000	0.909	18180
10000	0.826	8260
5000	0.751	3755
3000	0.683	2049
2000	0.620	1240
2000(scarp value)	0.620	1240
	Total PV of cash inflows	

NPV = PV of cash inflow - PV of cash outflows

NPV = 34724 - 30000

NPV = 4724

Comment: NPV of project y is higher than the NPV of project x. Hence, it is suggested that project y should be selected.

Initial outlay Rs. 50000, life of an asset 5 years Annual cash flow Rs. 12500, let us calculate IRR

Present value Factor = $\frac{Initial\ outlay}{Annual\ cash\ flow} = \frac{50000}{12500} = 4$

Present value of annuity table 8 % approximately

IRR = 8 %

Illustration:

When the annual cash flows over the life of the asset.

Initial investment Rs. 60000, Life of the Assets 4 years

1st year - 15000

2nd year - 20000

3rd year - 30000

4th year - 20000

Calculate the IRR

Discount 10%				12%		14%		15%	
year	Annual cash time	PVF	P value	PVF	P value	PVF	P value	PVF	P value
1	15000	.909	13635	.892	13380	.877	13155	.869	13055
2	20000	.826	16520	.797	15940	.769	15380	.756	15120
3	30000	.751	22530	.711	21330	.674	20220	.657	19710
4	20000	.683	13660	.635	12700	.592	11840	.571	11420

			66345		63350		60595		59285

Working:

15% = 715 (60000 – 59285)
14% = 595 (60595 – 60000)

$$14 + \frac{595}{715+595} \times (15-14)$$

$$14 + \frac{595}{1310} \times (1)$$

14+0.45 (1)
IRR = 14.45 %

5. The management of Fine Electronics Company is considering to purchase an equipment to be attached with the main manufacturing machine. The equipment will cost $6,000 and will increase annual cash inflow by $2,200. The useful life of the equipment is 6 years. After 6 years it will have no salvage value. The management wants a 20% return on all investments.

Required:

1. Compute net present value (NPV) of this investment project.

2. Should the equipment be purchased according to NPV analysis?

Solution:

Initial cost	$6,000
Life of the project	6 years
Annul cash inflow	$2,200
Salvage value	0
Required rate of return	20%

Item	Year(s)	Amount of cash flow	20% Factor	Present value of cash flow
Annual cash inflow	1 - 6	$ 2,200	3.326*	$ 7,317
Initial investment	Now	(6,000)	1.000	(6,000)
Net present value				$ 1,317

(1) Computation of net present value:

(2) Purchase decision:

Yes, the equipment should be purchased because the net present value is positive ($1,317). Having a positive net present value means the project promises a rate of return that is higher than the minimum rate of return required by management (20% in the above example).