

$$\text{OR} = \frac{\text{Rs. 2}}{6} \times 100 = 33 \frac{1}{3}\%$$

$$\text{BEP} = \frac{F}{\text{P/V Ratio}} = \frac{\text{Rs. 30000}}{33 \frac{1}{3}} \times 100$$

$$\text{BEP} = \text{RS. 90000}$$

$$\text{BEP} = \frac{F}{\text{C per unit}} = \frac{\text{Rs. 30000}}{\text{Rs. 2}} = 15000 \text{ Units}$$

(in units)

$$\text{MS} = \text{Actual Sales} - \text{BEP} \\ = \text{RS. 120000} - \text{RS. 90000} = \text{RS. 30000}$$

$$\text{OR} \\ \text{MS} = 20000 \text{ Units} - 15000 \text{ Units} = 5000 \text{ units}$$

$$\text{OR} \\ \text{MS} = \frac{\text{Profit}}{\text{P/V Ratio}} = \frac{\text{Rs. 10000}}{33 \frac{1}{3}} \times 100 = \text{RS. 30000}$$

$$\text{OR} \\ \text{MS} = \frac{\text{Profit}}{\text{C per unit}} = \frac{\text{Rs. 10000}}{\text{Rs. 2}} = 5000 \text{ Units}$$

#### Break-Even Chart

The break – Even point can also be computed graphically. A break-even chart portrays a pictorial view of the relationship between costs, volume and profit. The break-even point indicated in the chart would be one at which the total cost line and the total sales line intersect. It is an important aid to profit planning.

#### Construction of Break-even chart :

- Select scales for sale or production in units on the horizontal axis
- Select a scale for costs and revenues on the vertical axis
- Draw the fixed costs line parallel to horizontal axis
- Draw the variable cost line starting from the point on the vertical axis which represents fixed costs
- Draw the sales line, starting from the point of origin (zero) and finishing at the point of maximum sales.

#### Example

From the following data compute the Break-Even point by means of a break-even chart.

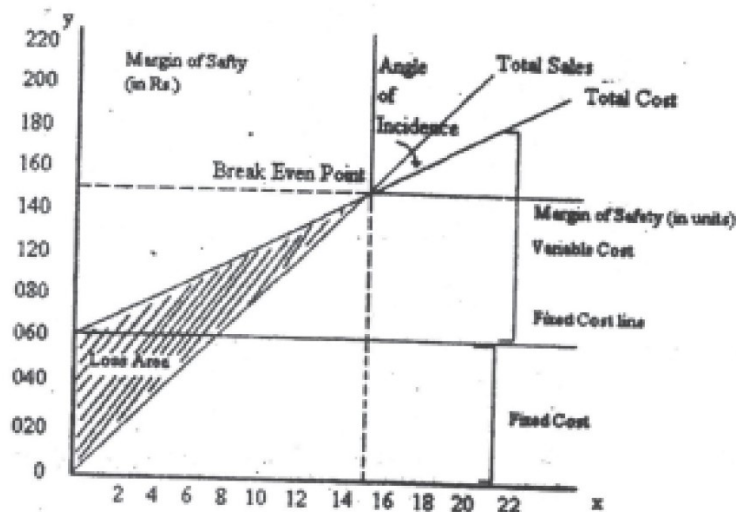
#### Volume of Sales (Units)

Sales at RS. 10	5000	10000	15000	20000
Fixed costs (RS)	60000	60000	60000	60000
Variable costs Rs. 6 per unit				
Current sales 20000 units				

**Solution**

Units output	Variable costs Rs.	Fixed costs Rs.	Total costs Rs.	Sales Rs.
5000	30000	60000	90000	50000
10000	60000	60000	120000	100000
15000	90000	60000	150000	150000
20000	120000	60000	180000	200000

The data can now be shown graphically as follows :



Sales and output (units in '000s)

Break-Even chart

From the figure I it can be noticed that the break-even point occurs when sales are 15000 units valued at RS. 150000

This can be verified algebraically

$$\text{BEP} = \frac{F}{C \text{ per unit}} = \frac{\text{Rs. } 60000}{4} = 15000 \text{ units}$$

**Angle of Incidence**

This is an angle formed between the total sales line and total cost line (Refer to figure No.1) A large angle of incidence indicates a high rate of profit while a narrow angle would show a relatively low rate of profits. This angle is important in boom periods when sales are expanding. Once the break-even point is reached, additional sales show a good profit return.

Practically utility of Break-Even Analysis

Break-Even analysis can be used to show the effect of a change in any of the following profit factors:

1. Change in selling price
2. Change in volume of sales
3. Change in variable costs
4. Change in fixed costs

These changes will now be illustrated using the same figures of the above example.



### 1. Effect of 20% increase in selling price

Marginal Cost Sheet		
	Output per Unit	20000 Units
	Rs.	Total Rs.
Sales	12	240000
Less : Variable Cost	6	120000
<hr/>		
Contribution	6	120000
Less : Fixed cost		60000
<hr/>		
Profit		60000

$$\text{Break-even points Rs.} = \frac{60000}{\text{Rs.6}} = 10000 \text{ units}$$

$$\text{Margin of safety} = 20000 - 10000 = 10000 \text{ units}$$

$$\text{Ms (on a percentage on total sales)} \text{ Rs.} = \frac{120000}{240000} \times 100 = 50 \%$$

It can be observed that due to 20% increase in selling prices the profit of ARBS Ltd., has increased by RS. 40000 and BEP has decreased to 10000 units of Rs. 120000. The same effects may be illustrated through Break-Even Chart :

### 2. Effect of 10% decrease in sales volume :

Marginal cost sheet 180000 units		
	Output per unit	Total
	Rs.	Rs.
Sales	10	180000
Less : Variable cost	6	108000
<hr/>		
	4	72000
Less fixed cost		60000
<hr/>		
Profit		120000

$$\text{P/V Ratio} = \frac{4}{10} \times 100 = 40\%$$

$$\text{BEP} = \frac{\text{Rs.60000}}{4} = 15000 \text{ units}$$

$$\text{MS} = \frac{\text{Profit Rs. 12000}}{\text{C per unit 4}} = 3000 \text{ units}$$

It may be observed that 10% reduction in sales volume has effected only the margin of safety. There is no change in BEP since the P/V ratio and Fixed costs are the same. For graphical representation the student may refer Figure No1.

**3. Effect of 20% decrease in variable cost :**

	Marginal cost sheet	20000 Units
	Output per unit	Total
	Rs.	Rs.
Sales	10.00	200000
Less : Variable cost (Rs. 6 less 20%)		
Contribution	04.80	96000
	-----	-----
	5.20	104000
Less Fixed costs		60000
		-----
	Profit	44000
		-----

$$\text{P/V Ratio} = \frac{5.20}{10} \times 100 = 52\%$$

$$\text{BEP} = \frac{600000}{5.2} = 11539 \text{ units}$$

$$(\text{Rs. } 10 \times 11539) = \text{Rs. } 115390$$

$$\text{Ms} = 20000 - 11539 = 8461 \text{ Units (Approx)}$$

Reduction in variable cost will improve the P/V ratio and reduce BEP Ultimately the MS also will increase.

**4. Effect of 10% increase in fixed costs**

	Output per Unit	20000 units
	Rs.	Total
	Rs.	Rs.
Sales	10	200000
Less : Variable Cost	6	120000
	-----	-----
Contribution	4	80000
Less : Fixed Costs (Rs. 60000 + 10%)		66000
		-----
	Profit	14000
		-----

$$\text{P/V Ratio} = \frac{\text{Rs. } 4}{\text{Rs. } 10} \times 100 = 40\%$$

$$\begin{aligned}
 \text{BEP} &= \text{Rs. } \frac{66000}{40} \times 100 = \text{Rs. } 165000 \text{ OR} \\
 &= \frac{\text{Rs. } 165000}{\text{Rs. } 10} = 16500 \text{ units BEP} = \frac{F}{P/V \text{ Ratio}} \\
 \text{Ms} &= \frac{\text{Rs. } 14000}{40} \times 100 = \text{Rs. } 35000 \text{ Ms} = \frac{P}{P/V} \text{ Ratio} \\
 \text{MS} &= (\text{Rs. } 200000 - \text{RS. } 165000) = \text{RS. } 35000
 \end{aligned}$$

Increase in fixed cost will increase BEP and thereby will reduce Ms.

#### Limitation of Break-Even Analysis :

1. When Break-even analysis is based on accounting date, as it usually happens, it may suffer from various limitations of such data eg. Neglect of imputed cost, arbitrary depreciation estimates and inappropriate allocation of overhead costs.
2. Break-even analysis is static in character. Costs and prices are subject to constant change from unit as alon from period to period.
3. Cost in a particular period may not be caused entirely by the output in that period.
4. Selling costs are specially difficult to handle in break-even analysis
5. The straight line total revenue curve presumes that any quantity might be sold at that one price. In real world, perfect competition is rare.
6. A basic assumption in break-even analysis is that the cost revenue volume relationship is linear. This is realistic only over narrow ranges of output.
7. Break-even analysis is not an effective tool for long range use and its use should be restricted to the short run only.
8. The area included in the Break-even analysis should be limited: If too many products, too many departments or too many plants are lumped together and graphed on a single break-even chart, both good and bad performances can easily be buried in the total picture of the group.
9. Break-even analysis assume that profits are a function of output ignoring the patent factor that they are also caused by other factors such as technological change, improved management changes in the scale of fixed factors of production and so on.

#### Additional Illustrations

#### Exercises

1. What benefits are to be gained from marginal costing? Are there pitfalls in the application of marginal costs?
2. Give a brief account of a practical application of marginal costing which you consider sound from a policy point of view.
3. A.E. Ltd., produces for components, the cost particulars of which are given below :

Components

	A	B	C	D
Elements of cost	Rs.	Rs.	Rs.	Rs.
Material	120	150	150	150
Wages	30	40	40	45
Variable over head	15	15	20	45
Fixed over head	20	35	30	30
	185	240	240	270
Output per machine hour (Units)	6	3	4	4

The limiting factors is shortage of machine capacity

You are required to advise management as to whether they should continue to produce all or some of these components (which are used in its main products) or they should buy them from a supplier who has quoted the following prices

A) Rs. 115 ; B). Rs. 175; C) Rs. 130; D) Rs. 180

4. A company reported its operating results for 1979 and 1980 as follows

	1979	1980
	Rs.	Rs.
Sales	400000	451500
Less : Cost of sales (variable)	320000	345000
	-----	-----
Gross profit	80000	106500
Less : Over head (fixed)	90000	95000
	-----	-----
Net profit (loss)	10000	11500
	-----	-----

During 1980 selling prices were raised by 5% prepare a statement bringing out the factors leading to the change in the profit earned in 1980.

5. Break-Even Chart must be applied with an intelligent discrimination, with an adequate grasp of assumption, underlying the techniques and of the limitations surrounding its practical applications. Elucidate the statement giving illustrations?

(C.A. Final, May 1976)

6. Calculate from the following data(i) the value of output at which the business would break-even, and (ii) the percentage of capacity at which it would break-even.

	Budget for 1975 based On 100% capacity	Shutdown Expenditure
	Rs.	Rs.
Direct wages	209964	---
Direct Materials	244552	---
Works Expenses	181820	---
Selling and Distribution expenses	61188	93528
Administration expenses	30000	40180
Net sales	840000	20508

(C.A. Final Nov. 1976)



7. A. What is "Margin of Safety"? What is its significance in business?

B. Calculate "Margin of Safety" from the following data :

	Ruby & co Rs.	Ratna & Co Rs.
Sales	100000	100000
Cost	80000	80000
Fixed		
Ruby & Co.,	30000	
Ratna & Co.,	50000	
Variable		
Ruby & Co.,	50000	
Ratna & Co.,	30000	
Profit	----- 20000 -----	----- 20000 -----

(C.A. Final, May 1976)

Book Recommended :

Principles and Practice of Management Accountance	:	Brown and Howard
Principles and Practice of Management Accounting	:	Man Mohan and Goyal
Management Accountancy	:	Batty

### Lesson 7

#### Contribution and Decision making

Decision making is a sequential process involving distinguishing and defining the problem, search for alternative solutions, evaluating, the alternatives, selecting out of the evaluated alternatives and reporting on actions taken and results achieved. Thus decision making is part of planning process. Managerial decisions are basically in the nature of solutions to problems. The problems which crop up in the management of an undertaking may be varied and may have different consequences.

In the previous lesson we have discussed the technique of marginal costing. It is to be borne in mind that the major purposes of this technique is not to provide net concepts of income of inventory, but rather to clarify the relationships between costs, volume and profits, particularly in the area of decision making, the present lesson deals with a group of specific operating decisions that require the decision maker to be selective in deciding which cost data he will use and how will use them.

#### Concept of Decision making

Decision making is the essence of management since it may make or mar the success of the business as a whole. In general it means taking the final step in deliberations before acting. In the management terms it has a specific meaning. It means the process of choosing among alternative courses of action, since if there is no choice, there is no decision to make. Moreover, since business takes place in a probabilistic world, every management decision deals with the future-whether it be ten seconds ahead (the decision to adjust a dial) or eighty years ahead (the

decision of where to locate the factory). A decision always involves a prediction. The function of decision making is therefore to select courses of action for the future. There is no opportunity to alter the past.

Future is risky. Ofcourse, routine decisions do not involve much of risk. However, most of the top management decisions are not of a routine nature. They are generally of a crucial and critical nature on account of their requiring huge investments and involving much uncertainties. But they cannot be avoided. The executive has to take them. It has been correctly observed. "Uncertainty is his (executive's) opponent, overcoming it is his mission. Whether the outcome is a consequence of lucky or wisdom, the moment of decision is without doubt the most creative event in the life of executive.

#### **Concept of Relevant Costs**

It has already been stated that for managerial decision making the decision maker must make use of relevant costs, The term 'relevant' means 'pertinent to decision at hand'. Costs are relevant if they guide the executive towards the decision that harmonise with top management's objectives. It will be ideal if the costs are not only relevant or pertinent but also accurate or precise.

It may be noted that 'relevance' and 'accuracy' are not identical concepts. Costs may be accurate but irrelevant or inaccurate but relevant. For example, the sales manager's salary may be precisely Rs. 60500 per annum, however, this fact has no relevance in deciding whether to add or drop a production line.

The following are the two fundamental characteristics of relevant costs:

#### **1. They are future costs**

Of course all future costs are not relevant to alternative choice decisions but all costs are not relevant unless they are future. This is because past costs are the result of past decisions and no current or future decisions can change what has already happened. For example, a company has to decide whether or not to accept an order for a particular product. In calculating the cost of this product to see if the order would benefit the company financially, the company uses the expected cost at the time, when it tends to produce the product. This could be quite different from the latest historical cost or standard cost. Thus, in forward decision-making, data regarding historical or standard cost is useful only as a basis for estimating future costs.

#### **2. They differ between alternatives**

As stated above all future costs are not relevant for decision making. Only such a future costs are relevant which may be expected to differ between alternatives. Those costs which will not change between different alternatives are to be ignored. For example a company is considering the substitution of an automatic process in place of a slow manual process. The material consumption per unit would be Rs. 2 under both the processes but the conversion cost would be Rs. 3 per unit under the new process in place of Rs.5 under the present process. In this case relevant cost for decision making is net the material cost which will not change but the conversion cost which will change. The cost of material should therefore be ignored. Conversion cost should only be considered. The proposal for automatic process should therefore be accepted since it will result in saving of Rs. 2 per unit.

#### **Concept of Differential Costs**

The terms differential cost means difference in cost between alternatives. It satisfied both the conditions necessary for relevant costs, i.e. it is a future cost as well as it changes between alternatives. Mr J.M. Clark has described the concept of differential costs as follows :



“When a decision has to be made involving an increase or decrease of n-units of output, the difference in costs between two policies may be considered to be the cost really incurred on account of these n-units of business, or of any similar units. This may be called the differential cost of a given amount of business. It represents the cost that must be incurred if that business is taken and which need not be incurred if that business is not taken.

Since the management's objective is to maximize the profit (or minimize the loss) of the firm, a comparison is made of differential costs with differential revenue under the available alternatives, to find out the most favourable alternative which will give the maximum possible return on the incremental capital employed in the business.

#### **Steps in Decision making**

Rational decision – making requires the taking of the following steps :

##### **1. Defining the problem**

The problem must be clearly and precisely defined so that quantitative amounts that are relevant to its solution can be determined.

##### **2. Identifying alternatives**

All possible alternative solutions to the problems should be identified. Sometimes consideration of more alternative solutions may make the matters more complex. In order to do away with this difficulty, after having identified all alternatives, the analysis should eliminate on a judgement basis those that are clearly unattractive. A detailed analysis of the remaining alternative should then be done.

##### **3. Evaluating quantitative factors**

Each alternative is usually associated with a number of advantages (relevant revenues) and disadvantages (relevant costs). The decision-maker should evaluate each of the relevant factors in quantitative terms to determine the largest of advantage.

##### **4. Evaluating qualitative factors**

In most cases the advantages and disadvantages associated with each alternative are capable of being easily expressed in quantitative terms. However, in certain cases there may be qualitative factors associated with certain alternatives which may not be capable of being expressed easily and correctly in quantitative factors depends on the judgement of the decision maker. Sometimes on account of a single qualitative factor, which though cannot be measured exactly and easily in monetary terms, the decision may just be reverse than what it was generally expected to be. For example, it is a known fact that many persons can meet their transportation need less expensively by using public conveyances rather than by operating their own automobiles. In spite of this people own and use their own automobiles for reasons of prestige, convenience, or other factors which cannot be measured in quantitative terms.

##### **5. Obtaining additional information**

In case the decision maker feels necessary, he may ask for additional information. As a matter of fact many decisions could be improved by obtaining additional information and it is usually possible to obtain such information.

##### **6. Selection of an alternatives**

After having identifying, evaluating, weighing and obtaining additional information (if necessary) the decision maker can select the alternative and act on it.

##### **7. Appraisal of the result**

Having implemented his decision, the decision maker should also from time to time carry out an appraisal of the results. This will help him in correcting his mistakes, revising his targets and making better predictions in the times to come.

**Marginal costing – specific decision making areas**

Some specific areas where marginal costing techniques could be applied in the decision making process are listed below :

1. Pricing decisions
2. Make or buy decisions
3. Selection of suitable product mix
4. Introduction of a new product
5. Discontinuation of a product line
6. Maintaining a desired level of profit
7. Problem of limiting or key factors
8. Accepting tenders, exploring possibilities of foreign markets
9. Alternative course of action
10. Determination of sales mix
11. Equipment replacement decision
12. Investment in assets
13. Change verses status quo
14. Expand or contract

**Pricing Decisions**

As stated earlier, the underlying theory of marginal costing is that any product which will produce revenue in excess of its variable cost is contributing towards recovering fixed costs and providing profits. Once the fixed costs are recovered at a particular level of production, the additional units of production would contribute larger amount towards profit. Thus, profit would be contribution of all such units towards profit. Thus, profit would be contribution of all such units minus all variable costs. On this fundamental principle of marginal costing, the pricing decisions are made. The fixation of prices may be :

1. Fixing selling price under normal conditions
2. Fixing selling price for additional orders for utilising idle capacity
3. Pricing for exporting and exploring new markets
4. Pricing during recession
5. Selling price at or below marginal cost

Sometimes, price of a commodity is fixed at marginal cost i.e., realising only variable cost and sacrificing fixed cost and profit. Under the compelling circumstances, prices are fixed even below the marginal cost i.e recovering only a part of a variable cost. The following are the circumstances where the prices is fixed below marginal cost.

1. To introduce a new product in the market, or to popularize a particular product
2. To maintain production at the existing level so as to avoid the retrenchment of the workers.
3. To explore foreign markets
4. To prevent loss of existing customers and future orders
5. To keep the plant in the running condition
6. To push the sale of a joint product
7. To clear the stock of perishable goods or seasonal product
8. To utilize the surplus resources which otherwise would go waste.
9. To eliminate the competitions of competitors especially weaker rivals



10. To avoid a situation when closure of the factory will increase the total loss including fixed costs in the form of interest on capital and other fixed charges
11. During a depression period where the prices have fallen in the market and it may be advisable to follow suit

However such price cutting should be effected most cautiously.

#### Disadvantages and dangers

The cutting of prices below total cost, is however, not that easy and calls for managerial policy. Following are the principal dangers.

#### 1. Difficulty in Raising the Prices Later

Sometimes it may be difficult to reduce the price to particular customers while making normal figures for others. Again, once prices have been slashed to meet a temporary shortage of others, it may not be easy to increase them later when business improves

#### 2. Possibility of an overall Loss

If too large a percentage of the sales is made at marginal prices, the total contribution will be insufficient to cover the fixed overheads and that an overall loss will result. It is only the marginal work which could be accepted at any price in excess of marginal cost. The bulk of the output should be priced sufficiently high to absorb the fixed costs of the machines and still provide a reasonable profit; it should be costed at a total cost basis. In the long run a lower selling price cannot be set without the allocation of fixed costs to the products. The difficulty in assigning fixed costs does not mean that they can be ignored in special circumstances.

#### 3. Incorrect Price Fixing

Since under marginal costing, period or time costs are ignored this may lead to incorrect pricing decisions. Two jobs might have the same marginal costs, but one may take a longer time for completion than the other. Unless, therefore, fixed costs based on-time factor are taken into account, their pricing will be wrong. It may lead to uneconomical action and unrealistic expectations.

#### 4. Increasing fixed costs

The industry is fast moving towards automation. If mechanisation was the first stage of industrial revolution, automation could be said to be its second stage. Because of automation, the incidence of fixed costs is naturally increasing, which must be allowed for. Failure to do so might burden the enterprise with heavy losses and sometimes irrational decisions.

#### 5. Bifurcating Costs

The problem that cannot be taken lightly is that of meaningfully separating the fixed and variable components of costs. In such separation, the bias has been towards fixed costs which has led to a gross understatement of variable unit costs and a gross over statement of variable unit costs and a gross over statement of total fixed expenses. If an analysis of a cost does not indicate a clear cut variability the cost is likely to be classified as fixed,

#### Make or Buy

In a make or buy decision, the B.E.P. is achieved when the additional cost making the parts is equal to the cost of buying the parts. Here, B.E.P. = Additional cost to make the parts = cost to buy the parts. Hence the decision would depend :

#### Illustration 1

A radio manufacturing company finds that while it costs Rs. 6.25 each to make component X 273Q, the same is available in the market at Rs. 5.75 each, with an assurance of continued supply.

The breakdown of costs is

Materials	Rs. 2.75 each
Labour	Rs. 1.75 each
Other variable	Rs. 0.50 each
Depreciation and other Fixed cost	Rs. 1.25 each
	-----
	Rs. 6.25 each

1. Should you make or buy?
2. What would be your decision if the supplier offered the component at Rs. 4.85?

**Solution**

1. The Variable cost of producing the component is Rs. 5 made up as follows:

Materials	Rs. 2.75
Labor	Rs. 1.75
Other variables	Rs. 0.50
	-----
Variables	Rs. 5.00
	-----

Since the depreciation and other fixed costs are sunk costs, the cost that can be saved if it is decided to buy the component instead of making it Rs. 5 per unit which is the variable cost. Hence, there will be no saving. Secondly, the cost of buying will be more Rs. 5.75 unless the capacity released, by the decision to buy, can be utilised in making some other profitable product. So the decision to make or buy will be influenced by the fact whether the capacity to be released by the stoppage of production of the component can be utilised profitably or not, If yes, then buying is preferable, if not, making is preferable.

(ii) If the price offered by the supplier is reduced to Rs. 4.85 each then there will be a saving of 15 paise per unit even if the capacity released cannot be profitably employed. In such a case it would be advantageous to buy the component and efforts may be made to utilise the spare capacity in producing other profitable products.

**Foreign Market**

**Illustration 2**

A manufacturer of a certain product has been selling exclusively in the Indian market up to now. He has just received his first export enquiry and wants to quote as competitively as the circumstances will allow. His latest Indian Cost sheet is :

	Rs
Raw material	34 per unit
Direct labour	13
Services	6
Works overhead	7
Office overhead	2
	---
Profit earned in India	62
India Selling price	6
	---
	68



Management is thinking of quoting a selling price somewhere between Rs. 62 and Rs. 68 per unit for this export order. One of the directors suggests quoting an even lower price based on the principles of marginal costing. As the firm's Accountant you are requested to compute the lowest the management could quote on these principles. State clearly any assumptions that you may make on the above facts and also on any other costs or facts.

#### Solution

Statement showing the lowest prices for the Export Enquiry

	Rs.
Raw materials	34 per unit
Direct Labour	13
Service	4
	---
Marginal Cost	51 per unit

The cost sheet would depend on the assumption made. The above is one illustrative cost sheet based on the principles of marginal costing, using the figures given in the latest "total" cost sheet. The assumptions are given below :

1. It is assumed that sufficient manufacturing capacity exists not to disrupt the supplies now being made to the Indian market while fulfilling this export order. If any such disruption takes place the negative costs of this disruption will be another direct or opportunity cost of fulfilling this export order.
2. It is assumed in the above calculation that service costs to the extent of Rs. 4 per unit are directly variable with the production put through the shops, and that the balance of Rs. 2 is fixed expense.
3. Similarly, it is assumed that works overhead is entirely fixed and should therefore, be excluded in marginal costing. It is possible that on occasion a part of the works overhead may actually be variable. Similarly, it is assumed that office overhead is totally fixed.
4. Certain direct costs of this export order like insurance, special packing, import duties in the foreign country, special commissions, etc. would have to be separately calculated and added on to the above marginal cost of Rs. 51 before the selling price is finally fixed. We would have to carefully determine whether the quoted price should be on FOB or CUF basis. In the same way, the benefit available from exports, such as cash subsidy that may be available, should be added to the available price.

On the above basis, any price above Rs. 51 (plus the items mentioned in Notes 1 and 4 above) will be the lowest possible price which can be quoted by the company.

#### Illustration 3

Sunita Manufacturing company produces Chairs. An analysis of their accounting reveals.

Fixed Cost	Rs. 50000 for the year
Variable Cost	Rs. 20 per chair
Capacity	2000 chairs per year
Selling price	Rs. 70 per chair

1. Find the break-even point
2. Find the number of chairs to be sold to get a profit of Rs. 30000
3. What will be the answer for (i) and (ii) if selling price changes to Rs. 60 per chair?

4. If the company can manufacture 600 chairs more per year with an additional fixed cost of Rs. 2000 what should be the selling price to maintain the profit per chair as it (ii) above?

**Solution**

**Statement of Present Profit**

	Per unit Rs.	Total Rs.
Sales 2000 chairs	70.00	140000
Less : Variable Cost	20.00	40000
Contribution	50.00	100000
Less Fixed costs	25.00	50000
Total profit	25.00	50000

$$\begin{aligned}
 \text{(i) B.E.P. (Units)} &= \frac{\text{Fixed costs}}{\text{Contribution per unit}} \\
 &= \frac{50000}{50} = 1000 \text{ units} \\
 \text{(ii) Sales (Units)} &= \frac{\text{F + P}}{\text{Contribution per unit}} \\
 &= \frac{50000 + 30000}{50} = 1600 \text{ units}
 \end{aligned}$$

are to be sold to earn profit Rs. 30000

$$\begin{aligned}
 \text{Profit per chair} &= \frac{\text{Rs. 30000}}{1600} \\
 &= \text{Rs. 18.75}
 \end{aligned}$$

(iii) Revised contribution per unit = Rs. 60 – Rs. 20 = Rs. 40

$$\begin{aligned}
 \text{(i) B.E.P. (Units)} &= \frac{\text{Rs. 50000}}{40} = 1250 \text{ units} \\
 \text{(ii) Sales (Units)} &= \frac{80000}{40} = 2000 \text{ Units}
 \end{aligned}$$

$$\begin{aligned}
 \text{(iv) } S &= V + F + P \\
 &= (2600 \times \text{XSP}) = \text{Rs. } 52000 + \text{Rs. } 52000 + \text{Rs. } 48750 \\
 &= \text{Rs. } 152750
 \end{aligned}$$

$$\begin{aligned}
 \text{Selling per unit therefore} &= \frac{152000}{2600}
 \end{aligned}$$



= Rs. 58.75

Per chair to maintain profit of Rs. 18.75

Verification of (iv)

	Per Unit Rs	Total Rs.
Sales 2600 Chairs	58.75	152750
Less : Variable cost	20.00	52000
	-----	-----
Contribution	38.75	100750
Less : Fixed Cost	20.00	52000
	-----	-----
Profit	18.75	48750
	-----	-----

#### Illustration 4

A machine total manufacturing company sells its lathes at Rs. 36500 each made up as follows :

Direct Materials	16000	
Direct labour	2000	
Variable overheads	5000	
Fixed over heads	3000	
Depreciation	2000	
Variable Selling overheads	500	
Royalty	1000	
Profit	2000	
	-----	31500
Central Excise Duty		2000
Sales Tax		3000
		-----
		36500
		-----

There is enough idle capacity

- A firm in Ababia has offered to buy 10 capstan lathes at Rs. 28500 each. Should the company be interested in the business?
- It has been decided to sell 5 such lathes to an engineering company under the same management at bare cost. What price should you charge?

#### Solution

The variable or marginal cost of producing and selling one capstan lathe be computed as follows :

Direct material	16000
Direct labour	2000
Variable overheads	5000
Variable selling overhead	500
Royalty	1000
	-----

Marginal cost	24500
Pride offered (export)	28500
	-----
Gross contribution Margin	4000
	-----

- a) If central excise duty is exempted then there will be a net contribution margin of about Rs. 1500 since sales tax payable (on the sale price) will be about Rs. 2500 or less. The company is having enough idle capacity so there is no possibility of increase in fixed cost, on the other hand the contribution available from sale of 10 lathes will partly reduce overheads burden. The profitability of the proposal is considerably influenced by the prospect of obtaining relief in central excise duty and also in the sales tax. The central government usually allows such relief in order to encourage export and to earn foreign exchange.
- b) Bare cost of the lathe is the total cost less selling overhead and profit that is Rs. 29000 to which may be added. Central excise duty and sales tax (if payable on inter-company sale) So the price chargeable is Rs. 29000 plus duty and tax payable.

### Profitability

#### Illustration 5

Company A and Company B, both under the same management make and sell the same type of product. Their budgeted Profit and Loss Accounts for January – June 1982 are as under.

	Company A		Company B	
	Rs.	Rs.	Rs.	Rs.
Sales		300000		300000
Less Variable				
Cost	240000		200000	
Fixed Costs	30000	270000	70000	270000
	-----	-----	-----	-----
		30000		30000
		-----		-----

You are required to

1. Calculate the Break-even point for each
2. Calculate the sales volume at which each of the two companies will make a profit Rs. 10000
3. Assess how their profitability will change with decrease or increase in volume

#### Solution

$$1. \quad \text{B.E.P.} = \frac{\text{Fixed cost}}{\text{Contribution}} \times \text{Sales}$$

Company A : Contribution = 300000 – 240000 = 60000  
300000

B.E.P. =  $\frac{30000}{60000} \times 300000 = \text{Rs. } 150000$

Company B : Contribution = 300000 – 200000 = 100000

- 70000
- B.E.P.  $\frac{70000}{100000} \times 30000 = \text{Rs. } 210000$
2. Desired contribution = F.C. + Profit desired  
 Desired contribution of company A  
 $= 30000 + 10000 = 40000$   
 $\frac{40000}{30000} \times 60000 = \text{RS. } 200000$
- Desired contribution of Company B  
 $= 70000 + 10000 = 80000$   
 $\frac{80000}{300000} \times 100000 = \text{Rs. } 240000$
3. Profit / volume ratio =  $\frac{\text{Contribution}}{\text{Sales}} \times 100$
- P/V ratio of company A =  $\frac{60000}{300000} \times 100 = 20\%$
- P/V ratio of company B =  $\frac{100000}{300000} \times 100 = 33 \frac{1}{3} \%$

#### Comparative statement of profitability

	Company A		Company B		
	Sales	Contribution	Profit / Loss	Contribution	Profit / Loss
	100000	20000	-10000	33333	-36667
	150000	30000	---	50000	20000
	200000	40000	10000	66667	3333
	250000	50000	20000	83333	13333
	300000	60000	30000	100000	30000
	350000	70000	40000	116667	46667
	400000	80000	50000	133333	63333

#### Illustration 6

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

	<b>Rs.</b>
Direct Material Cost per unit	8
Direct Labour cost per unit	5
Fixed overhead	24000
Variable overheads @60% on direct labour	
Selling price per unit	25
Trade Discount	4%

If sales are 15% and 20% above the break-even volumes determine the netprofit.

**Solution**

		Rs
<b>1. Contribution</b>		
Selling price per unit		25
Less : Trade discount 4%		1
.....		
Less : Variable cost per unit	Rs.	
Direct material	8	
Direct labour	5	
Variable over head @ 60% on Direct labour	3	16
	---	---
Contribution per unit		8
---		
Fixed cost	24000	
B.E.P. = $\frac{\text{Fixed cost}}{\text{Contribution}}$	= $\frac{24000}{8}$	= 3000 units
Sales Value at BEP 3000 X 25		= 75000
Less : Trade discount 4%		3000
		-----
Net sales value Rs.		72000

(ii) Determination of net profit if sales are 15% above BEP Volume

Sales at BEP	3000 units
Add : 15% of BEP	450
	-----
	3450
Contribution on 3450 units X 8	27600
Less : Fixed costs	24000
	-----
Profit	4800
	-----

**Capacity Utilization**

**Illustration 7**

A factory engaged in manufacturing buckets is working at 40% capacity and produced 10000 buckets per annum.

The present cost break-up for one bucket is as under :

	Rs.
Material	10
Labour cost	3
Overheads	5 (60% fixed)

The selling price Rs. 20 per bucket



It is decided to work at 50% capacity, the selling price falls by 3%. At 90% capacity, the selling price falls by 5% accompanied by a similar fall in the prices of material.

You are required to calculate the profit at 50% and 90% capacities and also calculate break-even point for the same capacity productions.

**Solution**

**Statement showing profit at different capacity levels**

Capacity levels	50%		90%	
Production (in units)	12500		22500	
	Per unit Rs.	Total Rs.	Per unit Rs.	Total Rs.
(a) Sales	19.40	242500	19.00	427500
Variable costs:				
Materials	10.00	125000	9.50	213750
Wages	3.00	37500	3.00	67500
Variable over heads	2.00	25000	2.00	45000
(b) Total variable cost	15.00	187500	14.50	326250

Contribution (a-b)	4.40	55000	4.50	101250
Less : Fixed Costs		30000		30000

Profit		25000		71250
--------	--	-------	--	-------

Break-even point

	Rs. 30000	RS.30000
(i) Units	----- = 6818	----- = 6667
	Rs. 4.40	Rs. 4.50
	6818 X Rs. 19.40	6667 X Rs. 19.00
	= Rs. 132270	= Rs. 126673

**Illustration 8**

**Calculate**

1. The amount of fixed expenses
2. The number of units to Break – even;
3. The number of units to earn a profit of Rs. 40000

The selling price per unit can be assumed of Rs. 100

The company sold in two successive periods 7000 and 9000 units and has incurred a loss of Rs. 10000 and earned Rs. 10000 as profit respectively.

**Solution :**

	Sales (units)	Profit / Loss (Rs.)
	9000	10000 profit
	7000	10000 (less)
	-----	-----
Substracting	2000	20000

$$\text{Contribution per unit} = \frac{20000}{2000} = \text{Rs. } 10$$

	Rs.
1. Contribution on 7000 units @ Rs. 10	70000
(+) Less incurred	10000
<b>Fixed cost</b>	<b>80000</b>
Contribution on 9000 units @ Rs. 10	90000
Less : profit earned	10000
Fixed cost	80000

- (ii)  $\text{BEP} = \frac{\text{Fixed cost}}{\text{Contribution per unit}} = \frac{80000}{10} = 8000 \text{ units}$
- (iii)  $\text{Fixed cost} = \text{Rs. } 80000 + \text{Profit desired Rs. } 40000 = \text{Contribution Rs. } 120000$

Number of units to be sold :

$$= \frac{120000}{10} = 12000 \text{ units}$$

#### Illustration 9

The following have been extracted from the accounts of a manufacturing undertaking, which produces a single product, for the previous (base) year

Units produced and sold	10000
Fixed over head	Rs. 20000
Variable costs per unit :	
Labour	4
Material	2
Overheads	0.80
Selling price per unit	10

In preparing the Budget for the current (budget) year the under noted changes have been envisaged :

Units to be produced and sold	5000
Fixed over heads increased by	5000
Fall in labour efficiency	20%
Special additional discount for bulk purchase of material	2 ½ %
Variable overheads per unit reduced by	1 ¼ %
Fall per unit in selling price	10%

Calculate :

1. the number of units which must be sold to break-even in each of the two years
2. the number of units which would have had to be sold to double the profit in the base year under base year conditions.

- h) Change in product mix
- i) Accounting errors
- j) Non standard material used
- k) Materials lost in theft etc.

$$MCV = MPV + MUV$$

Material usage variance can further be classified into material mix variance and material revised usage variance.

#### Material mix variance

It arises only when different raw materials are actually mixed to produce a product. It is the difference between the standard mix and the actual mix of materials

$$MMV = (\text{Revised standard Quantity} - \text{actual quantity}) SP$$

$$\text{Total weight of actual / Mix}$$

$$RSQ : \frac{\text{Total weight of actual / Mix}}{\text{Total weight of standard mix}} \times \text{Standard Quantity.}$$

$$\text{Total weight of standard mix}$$

When the actual quantity is less than the revised one, there is a favourable variance. It arises due to wrong mixing of material.

#### Material revised usage variance

It is the difference between the standard quantity and the revised standard quantity at standard price.  $MRUV = (\text{Standard Quantity} - \text{revised standard quantity}) \times S.P.$

It arises due to revision in standard quantity

$$MUV = MMV + MRUV$$

#### Material yield variance

The result obtained from MRUV can be calculated by preparing yield variance. It is the difference between the standard yield on actual input and the actual yield at the average standard price. It may be due to abnormal reason such as chemical reactions, heavy spoilage etc.

$$MYV = (\text{Standard Yield} - \text{actual yield}) \times \text{Average standard price}$$

If the actual yield – actual yield) X average standard price

If the actual yield is more, it is a favourable variance

$$\text{Total standard value}$$

$$\text{Average standard price} = \frac{\text{Total standard value}}{\text{Standard Unit (good)}}$$

$$\text{Standard Unit (good)}$$

The yield variance can be calculated considering the standard loss and the actual loss also.

$$(\text{Standard loss} - \text{actual loss}) \times \text{Average standard price}$$

If the actual loss is more, it is unfavourable

$$MRUV = MYV$$

#### Illustration : 1

Calculate possible material variance from the following details; Standard quantity allowed for manufacturing a unit is 20kg @ s. 2 per kg. On completion of 10 units it was found that 220 kgs were consumed @ Rs. 1.80 per KG.

#### Solution

$$\text{Materials cost variance} = -(\text{SP} \times \text{SQ}) (\text{AP} \times \text{AQ}) = (2 \times 200) - (1.80 \times 220) = 400 - 396 = 4(+)$$

$$\text{Materials price variance} = (\text{SP} - \text{AP}) \times \text{AQ} = (2 - 1.80) \times 220 = 44 (+)$$



Labour cost = Rs. 4 + 80% = Rs. 5

Variable overhead = 98 =  $\frac{3}{4}$  % of 0.80 paise = 0.79 paise

#### Exercise

1. Explain the specific decision making areas where the principles of marginal costing could be applied
2. A factory engaged in manufacturing poastic buckets is working at 40% capacity and produced 10000 buckets per annum. The present cost break-up for one bucket is as follows:

Material	Rs. 10
Labour	Rs. 3
Overheads	Rs. 5 (40% variable)

The selling price is Rs. 20 per bucket. If it is decided to work at 50 percent capacity, the selling price falls by 3%. At 90 percent capacity the selling price falls by 5% accompanied by a similar fall in the price of materials.

You are requested to calculate profit at 50 percent and 90 percent capacities.

(Answer Rs. 25000; Rs. 71250)

3. X Ltd., plans to earn Rs. 49500 after income taxes in 1986. The tax rate is to be 55% of net income before taxes. The fixed costs for the year are estimated at Rs. 90000. The contribution margin is estimated at 25% of sales revenue.

You are required to compute the sales revenue needed to earn a net income after income tax of Rs. 49500. If the contribution margin can be increased to 30 per cent, how much sales revenue will be required to earn a net income, after income tax of Rs. 49500.

(Answer Rs. 800000; Rs. 666667 app.)

4. A Ltd. Sold in two successive years 21000 and 27000 units, and incurred a loss of Rs. 30000 and earned a profit of Rs. 30000 respectively. The selling price per units is Rs. 100.

Calculate : (i) The amount of fixed cost (ii) the number of units to break-even (iii) the number of units to earn a profit of Rs. 120000

(Answer (i) Rs. 240000 (b) 24000 (iii) 36000)

#### Day to Day Decision Making

##### Determination of sales mix

Presuming that fixed costs will remain unaffected decision regarding sales / production mix is taken on the basis of the contribution per unit of each product. The product when gives the highest contribution should be given the highest priority and the product whose contribution is the least, should be given the least priority. A product giving a negative contribution should discontinued or given up unless there are other reasons to continue its production.

##### Illustration 1

Following information has been made available from the cost records of United Automobiles Ltd., manufacturing spare parts.

Direct materials	Per unit
X	Rs. 8
Y	Rs. 6
Direct wages	
X	24 hours @ 35 paise per hour

Y	16 hours @ 25 paise per hour
Variable overhead	150% of direct wages
Fixed overheads (total)	Rs. 750
Selling price	
X	Rs. 25
Y	Rs. 20

The directors want to be acquainted with the desirability of adopting any one the following alternatives sales mixes in the budget for the next period.

- 250 units of X and 250 units of Y
- 400 units of Y only
- 400 units of X and 100 units of Y
- 150 units of X and 350 units of Y

Stage which of the alternative sales mixes you would recommend to the management

Solution

**Marginal Cost statement (per unit)**

	Products	
	X	Y
Direct materials	8	6
Direct wages	6	4
Variable overheads	9	6
	--	--
Marginal cost	23	16
Contribution	2	4
	--	--
Selling price	25	20
	--	--

**Selection of Sales mix**

a.	250 units of X and 250 units of Y	
	Contribution :	
	Product X 250 units X 2	Rs. 500
	Product Y 250 units X 4	Rs. 1000
		<u>1500</u>
	Less : Fixed overheads	750
		<u>750</u>
	<b>Profit</b>	<b>750</b>
		<u>---</u>
(b)	400 units of product Y only	
	Contribution 400 X 4	Rs. 1600
	Less : fixed overheads	750
		<u>850</u>
	<b>Profit</b>	<b>850</b>
		<u>---</u>

(c) 400 units of X and 100 units of Y

Contribution		Rs.
Product X 400 X 2	=	800
Product Y 100 X 4	=	400
		----
		1200
Less : Fixed overheads		750
		----
Profit		950
		----

The alternative (d) is most profitable since it gives the maximum profit of Rs. 950.

### Illustration 2

The budgeted results for A company Ltd., included the following

		Rs. In lakhs	Variable cost as % of sales value
Sales			
Product	A	50.00	60%
	B	40.00	50%
	C	80.00	65%
	D	30.00	80%
	E	44.00	75%
		-----	-----
		244.00	65.77%
		-----	-----

Fixed overheads for the period is Rs. 90 lakhs, you are asked to (a) Prepare a statement showing the amount of loss expected, (b) recommend a change in the sales volume of each profit which will eliminate the expected loss. Assume that the sale of only product can be increased at a time.

### Solution

Statement showing the Estimated loss and the increased sales required to set off the loss

Rs. In lakhs

Particulars	A	B	C	D	E	Total
1. Sales	50.00	40.00	80.00	30.00	44.00	244.00
2. Variable cost	30.00	20.00	52.00	24.00	33.00	159.00
3. Contribution (1) - (2)	20.00	20.00	28.00	6.00	11.00	85.00
Fixed overheads						90.00
Loss						5.0
P.V Ratio (3)/(1)	40%	50%	35%	20%	25%	
Increased sales required to set of the loss*	12.5	10	14.29	25.00	20.00	



**Note :** As there is a budgeted loss of Rs. 5.00 lakhs and the sales of only one product can be increased, this loss has to be set off by additional contribution. As the fixed overheads are constant, additional contribution has been calculated by dividing the budgeted loss of Rs. 5 lakhs by the P/V ratios of respective products. The sales of any one of the products to the extent of the amount stated in the table would be sufficient to set off the loss.

#### Exploring new markets

Decision regarding selling goods in a new market (whether Indian or foreign) should be taken after considering the following factors.

1. Whether the firm has surplus capacity to meet the new demand?
2. What price is being offered by the market? In any case it should be higher than the variable cost of the product plus any additional expenditure to be incurred to meet the specific requirements of the new market?
3. Whether the sale of goods in the new market will affect the present market for the goods? It is particularly true in case of sale of goods in a foreign market at price lower than the domestic market price. Before accepting such an order from a foreign buyer, it must be seen that the goods sold are not dumped in the domestic market itself.

#### Illustration 3

A company annually manufactures 10000 units of a product at a cost of Rs. 4 per unit and there is home market for consuming the entire volume of production at the sale price of Rs. 4.25 per unit. In the year 1977 there is a fall in the demand for home market. Which can consume 10000 units only at a sale price of Rs. 3.72 per unit. The analysis of the cost per 10000 units is:

	Rs.
Materials	15000
Wages	11000
Fixed overheads	8000
Variable over heads	6000

The foreign market is explored and it is found that this market can consume 20000 units of the product if offered at a sale price of Rs. 3.55 per unit. It is also discovered that for additional 10000 units of the product (over initial 10000 units) the fixed overheads will increase by 10 percent. Is it worth while to try to capture the foreign market?

#### Solution

#### Statement showing the advisability of selling goods in foreign market

	Year 1976		Year 1977	
	Home market 10000 units	Home market 10000 units	Foreign market 20000 units	Total 30000 units
Material	15000	15000	30000	45000
Wages	11000	11000	32000	33000
Overheads				
Fixed	8000	8000	1600	96000
Variable	6000	6000	12000	18000
Total cost	40000	40000	65600	105600
Profit	2500 (less)	2800 (less)	5400	2600
Sales	42500	37200	71000	108200

From the above it is clear that it is advisable to sell goods in the foreign market. It will compensate not only for the loss on account of sale in domestic market but will also result in an overall profit of Rs. 2600

#### Illustration 3

A machine tool manufacturing company sells its lathes at x Rs. 36500 each made up as follows : Rs.

Direct materials	16000
Direct labour	2000
Variable overheads	5000
Fixed overhead	3000
Variable selling overheads	500

about the profitability of a product as compared to profit

3. The capacity utilization, ie. Whether the firm is working to full capacity or below normal capacity. In case a firm is having idle capacity, the production of any product which can contribute towards the recovery of fixed costs can be justified.
4. The availability of product to replace the product which the firm wants to discontinue and which is already accounting for significant proportion of total capacity
5. The long term prospects in the market for the product
6. The effect on sale of other products. In some cases the discontinuance of one produce may result in heavy decline in sales of other products affecting the overall profitability of the firm.

#### Illustration 4

A manufacturer is thinking whether he should drop one item from his product line and replace it with another. Below are given his present cost and output data :

Product	Price	Variable costs Per unit	Percentage of sales
Book shelves	60	40	30%
Tables	100	60	20%
Beds	200	120	50%
Total fixed costs per year		Rs. 750000	
Sales last year		Rs. 2500000	

The change under consideration consists in dropping the line of cabinets. If this dropping and change is made the manufacturer forecasts the following cost and output data

Product	Price	Variable costs Per unit	Percentage of sales
Book shelves	60	40	50%
Tables	100	60	10%
Beds	200	120	40%
Total fixed costs per year		Rs. 750000	
Sales last year		Rs. 2600000	

Is this proposal to be accepted ? Comment.

**Solution**

Existing Situation				Proposed Situation			
Book shelves	Tables	Beds	Total	Book shelves	Tables	Beds	Total
Less 750000	500000	1250000	2500000	1300000	260000	1040000	2600000
Less Variable Costs 500000	300000	750000	1500000	866667	97500	600000	1588166
250000	200000	550000	950000	433333	162500	416000	1011833
Less fixed cost			750000				750000
			200000				261833

The above analysis shows that the manufacturer will stand to gain in case he drops the production of tables in preference to cabinets. However, the demand for cabinets should be of a permanent nature.

**Working notes**

## Existing situation

## Computation of sales and variable costs

		Sales		Variable cost
		30		40
Book shelves	2500000 X	--	750000 X	---
		100		60
	= Rs. 750000			= Rs. 500000
		20		60
Tables	2500000 X	--	500000 X	---
		100		100
	= Rs. 500000			= Rs. 3000000
		50		120
Beds	2500000 X	--	1250000 X	---
		100		200
	= Rs. 1250000			= Rs. 750000

## Proposed situation

## Computation of sales and variable costs

		Sales		Variable cost
		50		40
Book shelves	2600000 X	--	1300000 X	---
		100		60
	= Rs. 1300000			= Rs. 866667



Cabinets	2600000 X	10 -- 100	2600000 X	60 ---- 160
	= Rs. 260000		= Rs. 97500	
Beds	2600000 X	40 -- 100	1040000 X	120 ---- 200
	= Rs. 1040000		= Rs. 624000	

**Illustration 5**

A company manufactures 3 products A, B and C. There are no common processes and the sale of one product does not affect prices or volume of sales of any other. The company's budgeted profit / loss for 1978 has been abstracted thus :

	Total	A	B	C
	Rs	Rs.	Rs.	Rs.
Sales	300000	45000	225000	30000
Production cost Variable	180000	24000	144000	12000
Production cost Fixed	60000	3000	48000	9000
Factory cost	240000	27000	192000	21000
Selling & Administration costs				
Variable	24000	8100	8100	7800
Fixed	6000	2100	1800	2100
<b>Total cost</b>	<b>270000</b>	<b>37200</b>	<b>201900</b>	<b>30900</b>
<b>Profit</b>	<b>30000</b>	<b>7800</b>	<b>23100</b>	<b>-900</b>

On the basis of above, the board had almost decided to eliminate product C, on which a loss was budgeted. Meanwhile, they have sought your opinion. As the Company's Cost Accountant what would you advise? Give reasons for your answer.

**Solution**

In order to comment upon the profitability of different products presentation of costs according to marginal costing system is essential. We have also to compute P/V Ratios.

	A	B	C	Total
	Rs.	Rs.	Rs.	Rs.
Sales	45000	225000	30000	300000
Production cost Variable	24000	144000	12000	180000
Selling & Adm Variable	8100	8100	7800	24000
Total variable & Costs	32100	152100	19800	204000
Contribution				
Sales variable costs	12900	72900	10200	96000
Less total fixed costs	5100	49800	11100	66000
Profit	7800	23100	(-) 900	30000
P/V Ratio	28.7%	23.4%	34.0%	

If product C is discontinued, the fixed cost of Rs. 10200 being recovered now cannot be recovered since product C is making a contribution of Rs. 102000 towards fixed cost. Considering the P/V ratio, product C doesn't seem to be unprofitable, as it is 34% being maximum as compared to other two products. Therefore, if the heavy burden of fixed overheads which has been apportioned to product C, being 39% of the total such burden, is not taken into account, product C is most profitable. Its profit volume ratio is higher as compared, to the other two products which leads us to conclude that total profit will increase if its output and sales can be increased.

#### Equipment Replacement Decision

While deciding about replacement of a capital equipment. The firm should take into consideration the resultant savings in operating costs and the incremental investment in the new equipment. In case the savings is more than the cost of raising additional funds for the new equipment, the proposal may be accepted. Besides this the firm must take into account the benefits the firm is likely to derive in the long run by replacing old and obsolete equipment. The undepreciated book value of the old equipment should be taken as irrelevant book value of the old equipment should be taken as irrelevant cost for this purpose. Many accountants disapprove replacement of an obsolete equipment by a new one by pointing out less on disposal of old asset. Such a tendency is unfortunate since the past costs are sunk costs and they should not be allowed to affect adversely the future decisions and firm's goal of maximising long-term profits.

#### Illustration 6

A company purchased a machine two years ago at a cost of Rs. 60000. The equipment has no salvage value at the end of its useful life and the company is charging depreciation according to straight line method. The company learns that a new equipment can be purchased at a cost of Rs. 80000 to do the same job and having an expected economic life of 4 years without any salvage value. The advantage of the new machine lies in its greater operating efficiency, which will reduce the variable operating expenses from the present level of Rs. 165000 to Rs. 130000 per annum. The sales volume is expected to continue at Rs. 2 lakhs per annum for the next four years.

You are required to evaluate the usefulness of the proposal



**Solution**

A natural tendency on the part of most of the accountant and the managers is to reject the proposal on the ground that the present machine is functioning well and is expected to render useful service for another four years. It scrapping at the present time would result in a loss of Rs. 40000 – the underpreciated book value.

This is not really the correct approach. The book value of the old machine is irrelevant while taking the decision made two years ago. The depreciation expense merely reflects apportionment of that past cost over the fiscal periods, whose income benefits from the use of the asset. The book value of the old asset should therefore, be eliminated as a factor while deciding whether to buy or not to buy the machine. Moreover, from the accounting point of view as immediate write off of Rs. 40000 or as depreciation of Rs. 10000 per annum for four years, results in no difference in total cost and product's profits for the next 4 years when taken as a whole. The following table analysis the profitability or otherwise of the new machine.

**Statement showing the profitability of the present and the new machine  
over a period of a years.**

	Present machine Rs	New machine Rs	Increase (Decrease) in cost Rs.
1. Sales	800000	800000	
2. Variable cost	660000	520000	140000
3. Loss on account of writing off of the old machine	40000	40000	
4. Depreciation of new machine		80000	80000
Total costs	700000	640000	60000
Net profit	100000	160000	60000
Average annual incremental income			Rs. 15000
Incremental investment			Rs. 80000
Return on incremental investment			18.75%

The above data is an indicator of the fact that there will be 18.75% return on additional investment of Rs. 80000. The return seems to be quite reasonable and therefore, it will be appropriate for the company to go in for the replacement of the present machinery by a new machine.

**Change versus status quo**

A firm is frequently faced with problem of continuing with the existing policies or change to the new ones. Such change may relate to reduce or not to reduce the selling price, process or not to process a product further, etc. While taking a decision about such matters, as in case of any other matter, the management must keep in view the long-term interests of the firm, For example it may be disadvantageous to sell a product below its variable or marginal cost, but sometimes the management may have to resort to this practice for the very survival of the firm.



**Illustration 7**

The following details have been furnished to you regarding two proposals which are for consideration before a firm.

- Improvement in the quality of the product, which will result in an additional sale of 5000 units at the existing price. However, this improvement in quality will result in crease in the variable cost by 10 paise per unit.
- Reduction in the selling price of the product by 12 paise per unit. This will push up sales by 5000 units.

In both cases the fixed expenses will increase by Rs. 1000

The present sales of the firm are 10000 units at the rate of Rs. 2.10 per unit. The variable cost is Rs. 1.60 per unit and the total fixed costs are Rs. 3000/

You are required to state whether it will be appropriate for the firm to select any of the new proposals or should it continue with the existing scheme.

**Solution**

	Present Case (a)		Proposed case
Expected Sales (Units)	10000	15000	15000
Selling price (Rs.)	2.10	2.10	1.98
Variable cost (Rs.)	1.60	1.70	1.60
Contribution (Rs.)	0.50	0.40	0.38
Total contribution (Rs.)	5000	6000	5700
Fixed expenses (Rs.)	3000	4000	4000
Profits (Rs.)	2000	2000	1700

**Expand or contract**

Expansions of business operations results in economics of scale, greater flexibility, lower fixed costs and greater capacity of the firm to meet the customers specifications. Expansion also brings with it may organisational and communications problems. Control and monitoring functions become more complex and delegation of authority and responsibility becomes more confused.

Since profit maximisation is a firm's primary goal, the expansion of business operations should also be viewed from that angle. Expansion results in heavy fixed costs, it means sales volume will have to be increased for meeting such costs through there may be increase in per unit contribution on account of economics of the scale., The management must therefore make sure that market will absorb the additional volume of required sales.

**Illustration 8**

A company is considering expansion. Fixed costs amount to Rs. 420000 and are expected to increase by Rs. 125000 when plant expansion is completed. The present plant capacity is 80000 units a year. Capacity will increase by 50% with the expansion. Variable costs are currently Rs. 6.80 per unit and are expected to go down by Rs. 0.40 per unit with the expansion. The current selling price is Rs. 16 per unit and is expected to remain same under either alternative. What are the break-even points under either alternative? Which alternative is better and why?

**Solution****Computation of Break-Even point under the Two Alternative**

	Present Position	After expansion
Fixed costs	Rs. 420000	Rs. 545000
Capacity (units)	80000	120000
Variable cost per unit	Rs. 6.80	Rs. 6.40
Contribution margin per unit	Rs. 9.20	Rs. 9.60
Selling price per unit	Rs. 16	Rs. 16

$$\text{Break-even point} = \frac{42000}{9.20} = 45652 \text{ Units} \quad \frac{545000}{9.60} = 56771 \text{ units}$$

Assuming that the whole production can be sold, the profit under the two alternative will be as under:

	Present position	After Expansion
Sales	Rs. 1280000	Rs. 1920000
Variable cost	544000	768000
Contribution	736000	1152000
Fixed cost	420000	545000
Profit	316000	607000

It is obvious from the above calculations that profits will be almost doubled after the expansion. Hence the alternatives of expansion is preferable

**Exercise**

1.. Present the following information to show to the management

- the marginal product cost and the contribution per unit
- the total contribution and profits resulting from each of the following sales mixture

	Product	Per unit
Direct materials	A	10.00
	B	9.00
Direct wages	A	3.00
	B	2.00
Fixed expenses Rs. 800		
(Variable expensed are allocated to products as 100% of direct wages)		
Sales price	A	20.00
	B	15.00

**Sales mixtures**

- 100 units of product A and 2000 units of B
- 1500 units of product A and 1500 units of B
- 2000 units of product A and 1000 units of B

Recommend which of the sales mixtures should be adopted

(Ans. Profit (1) Rs. 7200 (2) Rs. 8200 (3) 9200 Mixture

(iii) is recommended

2. From the following data you are required to present to the management

(i) The marginal cost of products X and Y and the contribution per unit

(ii) The total contribution and profit resulting from each of the suggested sales mixtures

Direct Materials	Rs. Per unit	Direct wages	Rs. Per unit
Product X	10.50	Product X	3.00
Product Y	8.50	Product Y	2.00
Fixed expenses (Total)		Selling price :	
Variable expenses	8.00	Product X	20.50
100% of direct			
Wages per product		Product Y	14.50

Suggested sales mixtures

No. of units

	Product X	Product Y
(a)	100	200
(b)	150	150
(c)	200	100

(Answer : Profit (a) Nil (b) Rs. 100 (c) Rs. 200 Mixture (c) is recommended)

Exploring New markets

3. Due to industrial depression, a plant is running at present at 50% of its capacity. The following details are available

	Cost of production per unit
Direct materials	Rs. 2
Direct labour	Rs. 1
Variable overhead	Rs. 3
Fixed over head	Rs. 2
	-----
	Rs. 8
Production per month	20000 Units
Total cost of production	Rs. 160000
Total cost of production	Rs. 140000
	-----
Less	Rs. 20000
	-----

An exporter offers to buy 5000 units per month at the rate of Rs. 6.50 per unit and the company hesitates to accept the offer for fear of increasing its already large operating losses.

Advise whether the company should accept the offer.

**Discontinuance of a product line**

4. A company which sells four products, some of them unprofitable, proposes disconnecting the sale of one of them. The following information is available regarding income, costs and activity for the year ended 31<sup>st</sup> March 1979;



	Products			
	A	B	C	D
Sales Rs.	300000	500000	250000	450000
Cost of sales at purchase price	200000	50000	210000	225000
Area of storage (sq.ft)	50000	40000	80000	30000
Number of parcel sent	100000	150000	75000	175000
Number of invoices sent	80000	140000	60000	120000

Its overhead costs and bases of allocation are :

Fixed costs :	Basis of allocation to products
Rent and insurance	Rs. 30000 sq.ft occupied
Depreciation	10000 Parcels sent
Salesman's salaries and expenses	60000 Sales volume
Administrative wages and salaries	50000 No. of invoices
Variable cost :	
Packing wages and materials	20 paise per parcel
Commission	4% on sales
Stationery	10 paise per invoice

You are required to :

- Prepare profit and loss statement, showing the percentage of profit or loss to sales for each product.
- Compare the profit if the company discontinues sale of product 'B' with the profit if it discontinues product C

Answer (q) A: Profit 9.5% B : Less 12.1% C; less 8% D; Profit 26.4% (v) Total profit if B is discontinued Rs. 79000. Total profit if B is discontinued Rs. 79000. Total profit if C is discontinued Rs. 56000)

#### Make or Buy

5. A radio manufacturing company finds that while it costs Rs. 6.25 each to make component X 273Q, the same is available in the market at Rs. 5.75 each, with an assurance of continued supply. The breakdown of costs is :

Materials	Rs. 2.75 each
Labour	Rs. 1.75 each
Other variables	Rs. 0.50 each
Depreciation and other fixed cost	Rs. 1.25 each
	-----
	Rs. 6.25 each

- Should you make or buy?
- What would be your decision if the supplier offered the component at Rs. 4.85 each?

Answer (a) Variable cost Rs. 5, hence net profitable to buy  
(b) There is a saving of 15 p.per component, the offer may be accepted.

#### Change versus status Quo

6. A company is producing two products X and Y from a just manufacturing process. The joint costs are Rs. 200000 and it has given a production of 1 lakh kilogram of 'X' having a selling price of Rs. 1.50 per kilogram and 2 lakh kilograms of 'Y' having a selling price or Rs. 1.50 per kilogram

The company is considering a proposal to process product 'X' into a new product 'Z' which sells at Rs. 3 per kilogram. The processing cost would amount to Rs. 175000 for converting one lakh kilograms of product 'X' to product 'Z'

You are required to advise the company about the acceptance or rejection of the above proposal

**Answer :** Transformation will result in an additional profit of Rs. 25000/ The proposal may therefore be accepted.

### Lesson 8

#### Capital Budgeting

A business concern has to face quite often the problem of capital investment decisions. Capital investment refers to the investment in projects whose results would be available only after a period of time. Hence, planning for capital expenditure has become an integral part of policy making and budgetary control. Capital expenditure has become one which is intended to benefit future period and normally includes investment in fixed assets and other development projects. It is essentially a long-term function, and such a decision to buy would influence the activity of the business for a considerable period of time. Therefore it is essential to keep close watch on capital expenditure.

#### Concept of Capital Budgeting

The term 'capital budgeting' refers to long-term planning for proposed capital outlays and their financing. It includes both raising of long-term fund as well as their utilization. It may thus be defined as the firm's formal process for the acquisition and investment of capital. It is the decision making process by which firms evaluate the acquisition of major assets. It involves firm's decision to invest its current funds for addition, disposition, modification and replacement of long-term or fixed assets.

Capital budgeting is a many-sided activity. It includes searching for new and more profitable investment proposals, investigating engineering and marketing considerations to predict the consequences of accepting the investment and making economic analysis to determine the profit potential of each investment proposal.

#### Operating Budget and capital budget

Many large firms prepare two different budgets every year. 1. operating Budget and 2. capital budget or Capital Expenditure budget. Operating Budget shows planned operations for the forthcoming period and includes sales, production, production cost and selling and distribution overhead budgets. Capital Budgets deal exclusively with major investment proposals. It assesses the economic of capital expenditure and investment.

Capital expenditure budget is a type of functional budget. It is the firm's formal plan for the expenditure of money for guidance as to the amount of capital assets during the budget period. The budget is prepared after taking into account the available production capacities, probable reallocation of existing resources and possible improvements in production techniques.

#### Importance of Capital Budgeting:

Capital Budgeting decisions are among the most crucial and critical business decisions. Special care should be taken in making these decisions on account of the following importance.

##### 1. Investment of Heavy Funds:

The capital investment involved is usually very large. It will have several far-reaching implications on the activities of business and may even seriously affect the very financial



stability or flexibility of the business. It is these implications which make capital budgeting so important.

## **2. 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 growth of the firm.

## **3. A wrong decision can prove disastrous**

It shows the possibility of expanding the production facilities to cover additional sales shown in the sales forecast. In fact the economic life of the asset acquired represents an indirect sales forecast for the duration of its economic life. Any error in this regard may result in over or under investment in fixed assets, that is, excess production capacity or inadequate capacity. Just an unwanted expansion results in unnecessary heavy operating costs to the firm, inadequate investments in assets would make it difficult for the firm to run the business in the long term. Thus, a wrong decision can prove disastrous for the long term survival of the firm,

## **4. 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.

## **5. Most difficult to make**

The capital budgeting decision requires an assessment of future events which are uncertain. It is really a difficult task to estimate the probable future events, the probable benefits and costs accurately in quantitative terms because of economic, political, social and technological factors.

## **6. Ensures selection of right source**

Capital expenditure decisions involve substantial funds which may not be immediately and automatically available. A well established capital budget would enable the management to decide in advance the sources of finance and ensure their availability at the right time.

### **Objectives of Capital Budgeting**

#### **1. Selection of the right mix of profitable projects**

The overall objective of capital budgeting is to allocate the available investible funds among the competing capital projects in order to maximise the total profitability. This is made possible by employing the various evaluation techniques for the selection of investment projects which contribute the maximum towards the overall investment objectives. In the case of public enterprises, capital budgeting may also assure fulfillment of other objectives such as promotion of employment, development of backward regions etc.

#### **2. Control of capital expenditure**

Control of capital expenditure is the next important objective of capital budgeting. This is achieved by forecasting the long-term financial requirements and thereby enabling the management to plan in advance to raise funds at the right time. The objective of preparing capital budgets is to plan and then compare the actual capital expenditure with the budgeted figure for controlling cost.

#### **3. Determining the required quantum and the right source of funds for investment**

4. The next important objective of capital budgeting is to determine the funds required for long-term projects and to see that such estimates fall in line with the company's financial



polities. It also aims to compromise between the available of funds and needs of the capital projects.

### **Types of Capital Investment Projects**

Investment projects may be classified in a number of ways. The following kinds of investment projects are commonly used by both private and public sector business units in their capital expenditure forecasts :

- a. Expansion of existing products lines
- b. 'Expansion into new product lines
- c. Replacement and modernisation scheme
- d. Projects for the utilisation of scraps and also of surplus installed capacity
- e. Cost reduction projects

The above listed projects are generally profit oriented and therefore they may be evaluated on the basis of their costs and benefits. But there are certain projects undertaken by all business units and on which it would be difficult to measure returns. For instance :

#### **1. Safety Precautions**

Provision of safety devices and equipment and may be demanded by various legal requirements.

#### **2. Welfare projects**

Provision of sports facilities for employees may boost morale. This cannot be evaluated financially.

#### **3. Service projects**

Provision of buildings and equipment for non-manufacturing departments may be essential, but the return from investment on them cannot be evaluated.

#### **4. Research and Development**

This may be initiated to improve the company methods or products. It would be very difficult to measure the return and R and D for a considerable period of time.

#### **5. Educational projects**

Provision of company training course may be instruments in improving the efficiency of employees but the returns from investment on such programmes may be difficult to evaluate.

### **Relevant cost for capital expenditure**

Different types of investment decisions call for different kinds of costs. Not all costs which are used in conventional accounting decision making. A few items of relevant costs are:

#### **1. Future costs**

Future costs are the projected or estimated costs. They are relevant for all types of investment decisions. Past cost are useful to the extent that they furnish a starting point for future cost projections. While calculating these costs, factors such as market conditions, political situations, general trend in the price levels, probabilities relating to future production and sales, economic life of the project etc.

#### **2. Opportunity costs**

Opportunity cost refers to the benefits of the best alternative foregone, As the investment in a project involves commitment of the firms investible funds. It becomes relevant to consider the opportunity of getting some benefits by employing the resources on some other alternative. Imputed cost is kind of opportunity cost. It is the cost which is not actually incurred, but would

be incurred in the absence, of self-owned factors. For instance cost or retained earnings, rent cost of retained earnings rent an company owned facilities etc.

### **3. Incremental cost or differential cost**

It is an additional cost due to a change in the volume of business or nature of business activity. Hence, it is useful for decisions such as adding new machinery, new product, changing distribution channel etc. As it refers to the cost of an added unit of the cost of an output, it is different from marginal cost.

### **4. Interest cost**

Accounting reports normally ignore the imputed interest on capital which is relevant for decision – making purposed interest cost constitutes the minimum acceptance criterion. For capital investment projects undertaken for profit. A firm must atleast recover its money cost before it can realise a profit on its own investment.

### **5. Depreciation and Income tax**

Depreciation is normally excluded while calculating cash flows for investment, appraisal and evaluation. But it is included for calculating the accounting rate of the project payment of taxes results in cash flows and, therefore is an important element in capital investment decession.

### **6. Secondary costs and benefits**

These costs and benefits are particularly relevant for the capital expenditure decisions in public enterprises. They are external to the project implementing body and therefore are called external cost and benefits. There are two types of externalities such as technological and pecuniary. The smoke and dust pollution and noise are examples of technological and pecuniary. The smoke and dust pollution and noise are examples of technological externalities. Pecuniary externalities are such as increasing rates of hire for factors of production, reduction in prices of substituted products, Secondary benefits are the increase in profits that can be attributed to the increased activity of processors, merchants and others who handle the projects output or input. The major problems associated with these costs and benefits are their identification and measurement. However for easy identification they should be related to the socio-economic objectives assigned to the project. To measure these costs and benefits, shadow prices or imputed prices should be used.

### **Capital expenditure Control**

The control over capital expenditure is growing in importance as mechanisation and automation are introduced and extended. However, formal capital budgeting is still undeveloped as it is of comparatively recent origin. Any system of capital expenditure control should have the following feature.

1. Planned development
2. Control of progress
3. Post-completion Audit
4. Forms and procedures

### **Planned Development**

Capital expenditure should be carefully planned to included developments in each site or department to ensure that each unit in the group or company is developing in step with the overall plan . Preparation of capital budget will be essential, even when companies do not operate a complete system of budgetary control; Capital appropriations and payments must be planned well in advance.



**Control of progress**

A progress record is necessary to show the progress of each capital project. The budgeted and actual expenditure will be compared for analysis and control. These reports are also used to ensure that the overall programme remains within the limits set by the policy of the company.

**Post-Completion Audit**

This is an important step of capital expenditure control. Post-completion audits of projects determine whether their actual values are in accordance with the one determined at the time of authorisation. This review can be very important because it may reveal inefficiencies in the system, and it would provide experience which would help in avoiding repetition of mistakes.

**Forms and procedures**

There should be a routine for controlling capital expenditure. A procedure should be adopted for the various stages, requesting for capital expenditures, authorisation, reporting the progress of such projects and audit. A well designed form should be used for these purposes for better control.

**Classification of Capital Expenditure Budget**

The following are the different types of capital expenditure budget :

**1. Initial Capital Expenditure Budget**

It is prepared for new project on the basis of estimates for civil works, electrical works, cost of plants, machinery, equipments and tools, preliminary expenses, pre-operative expenses and margin money.

**2. Capital Budget for Replacement and Expansion**

Expenditure necessary to replace worn out or damaged equipment are included in this group. Replacement may be undertaken for either maintenance of business or cost reduction of both. Expansion may be on existing products markets or into new products markets. Expenditures to increase output of existing products, or to expand outlet or distribution facilities in markets now being served are included under expansion of existing products or markets. Expansion into new products, markets, include those expenditures necessary to produce a new product or to expand into geographical areas not currently being served.

**3. Annual Capital Budget**

Usually every year there is some amount of capital expenditure for purchases of office equipments, vehicles, extension of building, furniture, machine accessories and the like.

Capital Expenditure projects may also be classified into

**(a) Profit earning projects**

These projects are taken up with a view to increasing or maintaining profits such as an investment in a plant which is expected to

1. improve the quality of products or
2. improve facilities increase productivity or
3. expand the productive capacity, or
4. reduce the cost

Profit earning projects may be either a new equipment or a new project or replacement project or expansion project. It may even relate to a project involving utilisation of surplus. It may relate to a project involving utilisation of surplus capacity.

**(b) Non-Profit Projects**

Capital investment are sometimes undertaken for meeting some contractual obligations such as labour agreements or statutory requirements or the orders of government or local



authorities. These may be in the form of safety measures for employees. Pollution control, provision of welfare and amenity measures, research and development projects, educational and training projects, service department project etc. Prestige – value projects are also undertaken in order to create a favourable image in the minds of the public. For instance, investments on guest houses, community hall, traffic umbrella, parking lots etc.

### **Project Reports**

The first stage in the development of a project is the preparation of a project report. The main influences affecting the capital investment decisions to be incorporated in the project report are as follows :

1. The amount of the investible funds available during the project period
2. The project cost and the production life of the investment
3. The phasing of the expenditure (the time of the investment) under the project
4. The amount of earning ie the rate of return expected from the investment project
5. The future net increase in income or future net savings in costs'
6. Opportunity or alternative cost
7. Interest cost of the capital to be invested
8. Tax implications and depreciation eg. Investment allowance, tax benefits in backward areas, tax holiday benefits etc
9. The effect of the project upon the profitability of the remaining sectors of the business.
10. Additional working capital requirements
11. The scrap value of the end of the effective life of the asset of a capital project must be evaluated (a) technical (b) Commercial (c) Financial (d) Managerial and (e) Economic feasibility.

Since the primary purpose of this lesson is to explain the financial feasibility of a project through profitability statements. Hence, it is assumed here that in dividing whether or not to invest in fixed assets, the sole criterion is the profit expected from the investment. It is the responsibility of the management is presented with the most useful information about each project. Thus decisions are based not on a guess work but on reasoned calculations.

### **Capital Budgeting – Methods of Ranking Investment Proposal**

The final step in the capital budgeting system involves evaluating the profitability of the alternative project and selecting the best one. A firm may face a situation on where more investment proposals may be a valuable than investible funds some proposals may be good, some moderate and many poor. Hence a ranking procedure has to be evolved so that the available funds can be allocated among different proposals in a profitable manner. Essentially, the ranking procedure envisages relating of a stream of future benefits to the cost of investments.

There are various techniques and criteria which can be used for evaluating the profitability of a capital project. Among the various methods, the following are commonly used by many business concerns;

1. Traditional of non-time value techniques
  - (a) Payable period
  - (b) Average rate of return
  - (c) Discounted cash flow methods
2. Modern or time value technique
  - (1) Net present value

- (2) Internal rate of return
- (3) Benefit / cost ratio

### Time unadjusted Return on Investment

The time unadjusted return on investment measures the percentage return on investment, which is obtainable from proposed investments. This is an indicator of the profitability of investment proposals. If there are several projects then they would be ranked according to the respective returns. Proposals which show a return on investment higher than the cost of capital are proposals worth undertaking. However, if funds are limited then projects will be ranked according to the profitability and the most profitable proposals would be accepted. Some projects may earn a return on investment higher than the cost of capital but have to be rejected due to the non-availability of funds.

### Time Adjusted Return on investment

In the previous method it is obvious that when we are computing the rate of return, we are considering two unlike things. One is investment which is invariably instantaneous and second the savings which are spread over the economic life of the investment proposal. The validity of comparing investment today with savings receivable at a future date is to be examined. This is because a rupee of savings receivable at a future date is not worth the same as a rupee today.

However, a good yardstick for measuring the profitability or otherwise of investment should possess the following characteristics.

- a. It should summarise the merit of an investment proposal ie it should be capable of determining the profitability of the investment proposal in object terms.
- b. It should provide basis for comparisons between different proposals
- c. It should be expressed in terms compatible with company's long range objectives
- d. Lastly, it should be simple to understand and operate

### Payback Period Method

One of the most commonly used techniques for evaluating capital investment proposal is the cash payback or otherwise simply called as payback. It attempts to calculate the period known as payback period, required to recover the initial investment out of inflow of net cash flows savings or profit by the investment. Payable period is defined as the number of years required for the savings in costs or net cash inflow to recoup the original cost of the project. Next cash inflow is calculated after tax but before method is based on the principle that every capital expenditure pays itself back over a number of years. It is called different names such as pay off period or recoupment period.

### Calculation of Payback Period

First of all in cases of even cash inflow, net cash flow is determined. Then divide the initial cost by annual cash inflow and the resulting quotient is the payback period

$$\text{Payback period} = \frac{\text{Original cost of investment}}{\text{Annual net cash inflows or savings}}$$

$$P = \frac{I}{S} \quad \text{or} \quad \frac{I}{C} \quad \text{or} \quad \frac{I}{E}$$

P = payable period



I = Initial investment

S = Savings per year

C = Annual Cash inflow

E = Earnings per year

If the annual cash inflows are uneven, then the calculation of payback period takes a cumulative form. The annual cash inflows are accumulated till they equal the original cost of investment and as soon as this amount is recovered, it is the expected number of payback years. Compare the payback period with some predetermined standard period in which the investment should pay for itself or with the payback period of the alternative project and if the project pays for itself in less time than the predetermined standard period of the period of the alternative project, the project is considered profitable and hence is accepted, otherwise it is rejected as unprofitable and hence is rejected as unprofitable and hence is accepted. Otherwise it is rejected as unprofitable. As a rule shorter the period the better is the investment made.

#### Illustration

An entrepreneur offered two options for investment with following cash flows; His decision criterion is a payback period of 3 years suggest the profitable investment.

	Option I	Option II
	Rs.	Rs.
Required Investment	8000	7000
Cash inflow		
Year 1	4000	2500
Year 2	3000	2500
Year 3	2000	2500
Year 4	1000	2500

#### Solution

Payback period option I = 2.5 years

Option II = 2.8 years

Option I would thus be preferred because of the shorter payable period

Payback period method is easy and useful so long projects of similar life duration are considered. The defect with the payback period method is its linked up historical coverage. It is useful provided the life of the different projects is identical. If one projects has a longer duration than the other. This method is not effective.

Secondly, the outflows of different years are added together to determine the number of years in which the investment, is recovered. But strictly speaking the flow of each year is interrupted by a time gap of a year.

Effect should be given to this time gap while aggregating together the inflow of various years. This is taken care of in the discounted cash flow method.

#### Return on Investment Method

The Return on investment (ROI) method takes into consideration the rate of return likely to be obtained from the project. This may be defined as the ratio of profit (net of depreciation and taxes) to initial capital outlay. Acceptable projects are ranked according to the respective rates of returned and the one which yields a highest rate of return is selected. This method is



often referred to as "Accounting Method", "Interest Rates of Return Method", "Financial Statement Method" etc.

In calculating the rate of return, different practices are adopted. For instance, the term investment is interpreted in two series (i) Original cost of the project and or (ii) average investment (i.e. present investment residual value) Similarly, the term 'return' or 'earning' may be.

#### Average Rate or Return on Investment

In this case, all the earnings after taxes and depreciation are added and then it is divided by the projects effective economic life. This gives the figure of average earnings over the period which is again divided by original investment. The project which gives the highest rate of return is normally selected.

$$\text{Formula} = \frac{\text{Net profit (After depreciation and Tax)}}{\text{Life of Asset X Capital}}$$

Average rate of return on average investment may also be calculated by dividing average investment. Average investment in a project is calculated at half of depreciable cost and residual or scrap value. The concept of taking only half or capital outlay is based on the view that the amount periodically recovered in the form of depreciation is ploughed back in the business.

- (a) total earnings
- (b) average annual earning
- (c) average annual net earning or
- (d) average additional earning per annum

The return on investment should be calculated on the basis of data available and whenever possible both total and average investment methods should be applied.

#### Total Income Method

Under this method, total earnings are ascertained (after depreciation and taxes) and then it is divided by the total investment. This gives the average rate of return per rupee invested in the project. The higher the earnings per rupee or the higher the percentage, the better the project and deserves to be selected

$$\text{Earning per unit of investment} = \frac{\text{Total earnings}}{\text{Project outlay}}$$

This can also be expressed as the total expected income from a project as a percentage of its capital cost.

#### Average Rate of Return on Investment

In this case, all the earnings after taxes and depreciation are added and then, it is divided by the project's effective economics life. This gives the figure of average earnings over the period which is again divided by original investment. The project which gives the highest rate of return is normally selected.

$$\text{Formula} = \frac{\text{Net profit (After depreciation and Tax)}}{\text{Life of Asset X capital outlay}} \times 100$$

Average rate of return on average investment may also be calculated by dividing average rate of return by average investment. Average investment in a project is calculated at half of

depreciable cost and residual or scrap value. The concept of taking only half of capital outlay is based on the view that the amount periodically recovered in the form of depreciation is ploughed back in the business.

$$\text{Average investment} = \frac{\text{Initial investment} + \text{Scrap value}}{2}$$

$$\text{Average Rate of return} = \frac{\text{Annual net Income}}{\text{Average investment}} \times 100$$

### Illustration 2

The Directors of Madras Rubber Factory Ltd., consider a proposal to invest a sum of Rs. 100000 on a plant that has an expected life of 5 years at the end of which has no residential value.

The expected annual incomes during the life of the plant are

At the end of	1 Year	Rs. 30000
	II year	Rs. 40000
	III year	Rs. 40000
	IV Year	Rs. 20000
	V Year	Rs. 30000
		-----
	Total	Rs. 160000
		-----

Money is available at an interest rate of 10% per annum. Calculate rate of return and advise the directors of the company.

**Solution**

**Calculation of Rate of Returns :**

Total earnings (in five years)	160000
Less : cost of interest	100000
	-----
Net yield in five years	60000
	-----

$$\text{(a) Average Return} = \frac{60000}{5} = \text{Rs. 12000}$$

$$\text{(b) Average Return on Original investment} = \frac{12000}{100000} \times 100 = 12\%$$

$$\begin{aligned} \text{(c) Average Return on Average investment} &= \frac{12000}{\frac{100000}{2}} \times 100 \\ &= \frac{12000 \times 2 \times 100}{100000} \\ &= 24\% \end{aligned}$$

Since the rate of Return from the proposed investment is more than the market rate of interest (10%) the directors of this company can proceed to invest in this plant.

### Illustration 3

Chidambaram Textiles Ltd has a machine which has been in operation for six years. The management is considering a proposal to purchase an improved model of a similar machine which gives an increased output. Give your opinion as a management accountant in regard to the proposal from the following data.

	Old machine (Rs)	New machine (Rs)
1. Purchase price of machine	60000	120000
2. Expenditure p.a. on account of		
i) Power consumption	7000	8000
ii) Consumable stores	4000	5000
iii) Repairs and maintenance	5000	4000
3. Labour cost per running hour	2	2.25
4. Units of output per hour	40	60
5. Machine running hours per annum	2000	2000
6. Material cost per unit	0.40	0.40
7. Selling price of output per unit	1.00	1.00
8. Estimated life	10 Years	10 years

### Statement of profitability

	Old machine	New machine
Purchase price (Rs.)	60000	120000
Estimated life (Years)	10	10
Units per annum	80000	120000
	Rs.	Rs.
1. Sales	80000	120000
2. Cost of production		
Materials	32000	48000
Wages	4000	4500
	36000	52500

#### Variable overheads :

Power	7000	8000		
Consumed Stores	4000	5000		
Repairs	5000	4000		
	-----	-----	16000	17000
Marginal cost			-----	-----
			52000	69500



Add Depreciation	6000	12000
	-----	-----
	58000	81500
	-----	-----
3. Profit before tax	22000	38500
Less Tax @ 50%	11000	19250
	-----	-----
Profit after tax	11000	19250

4. Average additional profit per annum  
 Before Tax (38500 – 22000) = 16500  
 After Tax (19250 – 11000) = 8250

Average additional profit

Profitability =  $\frac{\text{Average additional profit}}{\text{Average Investment}} \times 100$

Average Investment

60000

Before tax =  $\frac{16500}{60000} \times 100 = 27.5\%$

8250

60000

After tax =  $\frac{8250}{60000} \times 100 = 13.75\%$

60000

3. What considerations other than profitability are made in managerial decisions about investment proposals?

The proposed project will yield an additional return on capital invested on 27.5% before tax or 13.75% after tax which is considered to be satisfactory. Therefore the new project may be undertaken.

#### Discounted Cash Flow Techniques (DCT)

Since money has a time value, time factor in investment is fundamental rather than incidental for the purpose of evaluating investments. Cash flows received in different years should not be treated to have uniform value. The nominal value of rupee received today is more valuable than a rupee to be received a year later. The discounted cash flow method takes the time factor of income into consideration and the other methods like Payback and Return on Investment do not take time factor into consideration.

Discounting involves reducing the value of the future returns to make it directly comparable to the values at present. Suppose we could invest any money today in the capital market for a return of 10 per cent. Then one rupee today would be worth Rs. 1.10 in one year's time. Conversely we can say that Rs. 1.10 in a year's time is worth Rs. 1 now, at a rate of interest of 10 per cent. Therefore Rs. 1 in a year's time worth 91 paise (1/1.1) now, since 91 paise now could be invested at 10% interest rate of get Rs. 1 in a year; time and Rs. 1.21 in two years time. The rate at which the future cash flows are reduced to their present value is termed as discount rate. Realistic capital investment appraisal depends on two factors, viz discounting period and a suitable discount rate. Normally, the economic life a project is used as the discounting period.

#### Net Present Value Technique

NPV may be defined as the excess of present value of project cash inflows over that of outflows. The rate of discount employed for obtaining the present value of cash flows. Under

this method the discount rate is assumed. Usually this assumed discount rate should be equal to the cost of capital. Unless a capital project is expected to yield atleast as much as the cost of capital, the project should not be accepted.

#### Illustration 4

The Alpha company Ltd., is considering the purchase of a new machine. Two alternative machines (A and B) have been suggested each costing RS. 400000. Earnings after taxation are expected to be as follows :

Year	Cash flow	
	Machine A Rs.	Machine B Rs.
1	40000	120000
2	120000	160000
3	160000	200000
4	240000	120000
5	160000	80000

The company has a target rate of return on capital at 10 percent and on this basis you are required to compare the profitability of the machines and state which alternative you consider financially preferable. The present value of Re.1 at 10% are as follows

I year	0.91
II year	0.83
III year	0.75
IV Year	0.68
V Year	0.62

#### Solution

#### Statement of Net present value

Year	Cash in flow Machine A	Cash in flow Machine B	PVF 10%	Present Value	
				A	B
1	40000	120000	0.91	36400	109200
2	120000	160000	0.83	99600	132800
3	160000	200000	0.75	120000	150000
4	240000	120000	0.68	163200	81600
5	160000	80000	0.62	99200	49600
	720000	680000		518400	523200

#### Recommendations

Machine 'B' is financially preferable. Though the total cash inflow is greater for machine A than for machine B the net present value of machine B is greater than machine A (Rs. 123200 as against RS. 118400). This is so because the cash inflows in the earlier years are greater for machine B than for machine A.

**Other methods**

The other methods (or Criteria) used, not very often, for evaluating the capital expenditure proposals are :

**1. Degree of Urgency Method**

It is a qualitative and sulylative methods of ranking projects. Some projects are needed at once to the survial of the firm while some others may be postponed to future. Those projects that cannot be postponed and are needed at once are undertaken first eg,. Break down in production process.

**2. First Year's Performance Method**

Under this method, the investment projects are evaluated on the basis of their impact on revenue from sales or the savings in expenses resulting from the improved technique or equipment. If the sales revenue exceeds all the added expenses including interest and depreciation, the investment is accepted, otherwise it is rejected.

**3. Comparative Cost Method**

In this method, comparison is made between the original costs of alternative investment proposals and the investment that shows the minimum cost is preferred, provided that other things remaining constant.

**4. Annual Cost Method**

Under this method, the capital as well as the operating costs of alternative investment schemes are converted into equivalent annual costs at an assumed rate of interest and one which has the lowest annual cost is preferred.

**5. Net Terminal Surplus Method**

The annual cash inflows are compounded for the respective number of years from the first year of their generation upto the end of the life of the project. If the aggregate compounded value of the annual cash inflows exceed the aggregate to compounded value of the investment, the project provides a net terminal surplus. The project that provides the greatest net terminal surplus will be the one to be selected on this basis.

**Exercise**

1. What do you understand by capital budgeting?
2. Describe some circumstances where the payback method of analysis would be useful?
3. What are the various methods of financing capital projects?
4. Difference between
  - (a) IRR method and NPV method
  - (b) Payback reciprocal and rate of return on investment
  - (c) Investment decisions and operating decisions

**Exercises**

1. A project cost Rs. 2000000 and yields annually a profit or Rs. 300000 after depreciation @ 12 ½ but before tax at 50%. Calculate the pay-back period.
2. ABC Ltd. is considering two projects. Each requires an investment of Rs. 10000. The firm's cost of capital is 10%. The net cash inflows from investment in the two projects X and Y are as follows

Year	X	Y
1	Rs.5000	Rs.1000
2	4000	2000



3	3000	3000
4	1000	40000
5	-----	50000
6	-----	60000

The company has fixed three years pay-back periods as the cut off point. State which project should be accepted.

(Ans. Project X should be accepted)

3. Each of the following projects requires a cash outlay of Rs. 10000. You are required to suggest which projects should be accepted if the standard pay-back period is 5 years.

Year	Cash flows		
	Project X Rs.	Project Y Rs.	Project Z Rs.
1	2500	4000	1000
2	2500	3000	2000
3	2500	2000	3000
4	2500	1000	4000
5	2500	-----	-----

(Ans: Payback period in each case is 4 years. However, project Y is the best out of all since in its case inflows are higher in initial years)

4. A company has to choose one of the following two mutually exclusive projects. Both the projects have to be depreciated on straight line basis. The tax rate is 50%

Year	Cash flows	
	Project A Rs.	Project B Rs.
0	-15000	-15000
1	4200	4200
2	4800	4500
3	7000	4000
4	8000	5000
5	2000	10000

You have to use Pay-back period as the criterion

(Ans: Project A should be preferred)

5. X Ltd. Is considering the purchase of new machine which will carry out operations performed by labour. A and B are alternative models. From the following information. You are required to prepare a profitability statement and work out the pay-back period in respect of each machine.

	Machine A	Machine B
Estimated life of machine (years)	5	6
Cost of machine	Rs. 150000	Rs.250000
Cost of indirect materials	6000	8000
Estimated savings in scrap	10000	15000

Additional cost of maintenance	19000	27000
Estimated savings in direct wages		
Employees not required	150	200
Wages per employee	600	600

Taxation is to be regarded as 50% of profit (ignore depreciation for calculation of tax) which model would you recommend? State your reasons.

(Ans. Pay-back period in case of Machine A is 4 years and in case of Machine B, it is 5 years. Hence, Machine A is preferable)

6. Project X initially costs Rs. 25000. It generates the following cash flows:

Year	Cash In flows	Present value of Rs. 1 (10%)
1	Rs.9000	.909
2	8000	.826
3	7000	.751
4	6000	.685
5	5000	.620

Taking the cut-off rate as 10% suggest whether the project should be accepted or not.

(Ans : NPV RS. 2244, the project should be accepted)

7. Using the information given below, compute the pay-back period under (a) Traditional Pay-Back method and (b) Discounted Pay-back Method and comment on the results:

Initial out lay	Rs. 80000
Estimated life	5 years
Profit after tax :	Rs.
End of year	1    Rs. 6000
	2    14000
	3    24000
	4    16000
	5    Nil

Depreciation has been calculated under straight line method. The cost of capital may be taken at 20% p.a. and the P.V. of Re. 1 at 20% p.a. is given below.

Year	1	2	3	4	5
P.V. Factor	.83	.69	.58	.48	.40

(Hint. (i) Add depreciation of Rs. 16000 to net profit each year for determining cash flows, (ii) Discount the cash for determining the present values for calculating pay-back period according to method (b))

8. There are two projects X and Y requires an investment of Rs. 26000 while Y requires an investment of Rs. 38000. The cost of capital is 12% On the basis of the following cash inflows and present value of Re.1 at 12%. You are required to state which project should be accepted.

Year	Cash Inflows		Present Value of Rel sy 12%
	Project X (Rs.)	Project Y (Rs.)	
1	9000	8000	.893
2	7000	10000	.797
3	6000	12000	.712
4	5000	14000	.636
5	4000	8000	.567
6	4000	2000	.507
7	3000	16000	.452
8	3000	----	.404
9	3000	----	.361
10	3000	----	.322

(Ans. NPV Project X Rs. 3981; NPV Project Y Rs. 7344; Project Y to be preferred)

#### Solution

#### Risk analysis in Capital Budgeting.

Risk is linked with business decision. It varies from one investment proposal to another. Some proposals may not involve any risk. For instance, investment in government securities which assure a return at a fixed rate. Some may be less risky like expansion of the existing business while others may be more risky such as taking up a new venture. A change in the business risk complexion of the firm also changes the perception of the investors and creditors about the firm. Such a change in their outlook will adversely affect the total valuation of the firm. It is, therefore, necessary that while evaluating capital investment proposals, a firm should take into account the effect that their acceptance will have on the firm's business risk as envisioned by its investors and creditors. Other things remaining the same, a firm should prefer a less risky investment proposal as compared to a more risky investment proposal.

#### What is Risk?

Riskiness of an investment proposal can be judged from the variability of its possible returns. For example, if a person invests Rs. 10,000 in Government securities carrying 10% interest, he can accurately estimate the return that he will get on his investment years after year. His investment is, therefore, risk free. In the other hand if he invests this amount in shares of companies, he will not be in a position to correctly estimate his return year after year on account of possible variation in dividend rates. His investments in shares is therefore, relatively risky as compared to his investment in Government securities. Thus, the term risk with reference to capital budgeting decisions may be defined as the variability that is likely to occur in future between the estimated and the actual returns. The greater is the variability between the two, the more risky is the project and vice-versa.

The decision situations as to risky may be classified into three types :

1. Certainty (or no risk)
2. Uncertainty, and
3. Risk



A risk situation is one in which the probabilities of a particular event occurring are known while an uncertain situation is one where these probabilities are not known. In other words, in case of risk chance of future loss can be foreseen – because of past experience. For example estimating loss in demand for tractors on account of poor harvest. In such a case the danger has been identified, that is, poor harvest and one can assign probabilities to this risk say 40% fall in demand due to this factor. On the other hand in case of uncertainty, the future loss cannot be foreseen, hence the management cannot deal with in planning process. For instance a firm investing in a foreign country may not foresee a revolution and takeover by an unfriendly group. This happened in Cuba in the late 1950's.

The basic difference between risk and uncertainty is that variability is less in risk as compared to uncertainty.

#### **Incorporation of Risk Factor**

Incorporation of risk factor in capital budgeting decisions is a difficult task. Some of the popular techniques used for this purpose are as follows.

- (i) **General Techniques**
  - (a) Risk adjusted discount rate
  - (b) Certainty equivalent
- (ii) **Quantitative Techniques**
  - (a) Sensitivity analysis
  - (b) Probability Assignment
  - (c) Standard Deviation
  - (d) Decision tree

#### **Risk Adjusted discount rate**

The risk adjusted discount rate is based on the presumption that investors expect a higher rate of return on risky projects as compared to less risky projects. The rate requires determination on of (i) risk-free rate and (ii) risk premium rate. Risk free rate is the rate at which the future cash inflow should be discounted had there been no risk. Risk premium rate is the extra return expected by the investor over the normal rate on account of the project being risky. Thus risk adjusted discount rate is a composite discount rate that take into account both the time and risk factors. A higher discount rate will be used for more risky projects and a lower rate for less risky project.

#### **Illustration 1**

From the following data, state which project is better project

Cash flow	A	B
Year 0	-10000	-10000
1	4000	5000
2	4000	6000
3	2000	3000

Risk less discount rate is 5%. Project A is less risky as compared to project B. The management considers risk premium rates at 5% and 10% respectively appropriate for discounting the cash inflows.

Risk adjusted discount rate project

$$A : 5\% + 5\% = 10\%$$

$$B : 5\% + 10\% = 15\%$$

Year	Discounted Cash Flows	
	Project A @ 10%	Project B @ 15%
0	-10000	-10000
1	3636	4350
2	3304	4536
3	1502	1974
	-----	-----
	8442	10850
	-----	-----
	-1558	860

Project B is superior to Project A. Since NPV is positive it may be accepted.

#### Advantages

- It is simple to calculate and easy to understand
- It incorporates the risk-averse attitude of investors

#### Disadvantages

- The determination of appropriate discount rates keeping in view differing degrees of risk is arbitrary. It may not, therefore, give objective results.
- Conceptually this method is incorrect since it adjusts the wrong element. As a matter of fact it is the future cash flow which is subject to risk. Hence it is to be adjusted and not the required rate of returns.
- The method results in compounding of risk over time, since the premium is added to the discount rate. This means that the method presumes that the risk necessarily increases with time which may not be correct in all cases.
- The method presumes that the investors are averse to risk. Ofcourse, this is true in most of the cases. However, there are investors who are risk-seekers and are prepared to pay premium for taking risk. In their case the discount rate should be reduced rather than increased with increase in degree of risk.

In spite of the disadvantages the method is most widely used on account of its simplicity.

#### Certainty equivalent co-efficient

According to this method the estimated cash flows are reduced to a conservative level by applying a correction factor termed as certainty equivalent co-efficient. The correction factor is the ratio of riskless (or certain) cash flow to risky cash flow.

$$\text{Certainty equivalent co-efficient} = \frac{\text{Riskless cash flow}}{\text{Risky cash flow}}$$

Riskless cash flow means the cash flow which the management is prepared to accept in case there is no risk involved. Naturally this will be lower than the cash flow which will be there in case the project is risky. For example, a project is expected to generate a cash flow of Rs. 20000. The project is risky but management feels that it will get at least a cash flow of Rs. 12000. It means that certainty equivalent coefficient is 6 (ie 120000/ 20000)

Certainty equivalent coefficients can be calculated for estimated cash flows which may be used for the purposes of determining IRR or NPV capital budgeting decisions.

**Illustration 2**

Using the information given in illustration – 2state which project is better if certainty equivalent coefficient are :

	Project A	Project B
1 <sup>st</sup> Year	.90	.80
2 <sup>nd</sup> Year	.80	.70
3 <sup>rd</sup> Year	.60	.50

**Solution****Discounted Cash Flows at 5%**

Year	Project A			Project B	
	Certain cash flow	PV	Certain cash flows		PV
0		-10000	-10000	1000	-10000
1	4000 X .90	3600	3427 5000 X .80	4000	3808
2	4000 X .80	3200	2902 6000 X .70	4200	3809
3	2000 X .60	1200	1037 3000 X .50	1500	1296
	NPV		-2634		-1087

Project B is better than project A. However, in both cases the NPV is in negative and therefore, none of them can be accepted.

**Quantitative Techniques****(a) Sensitive Analysis**

In the methods explained so far we have considered only one figure of cash flows for each year. However, there are chances of making some estimation errors. The sensitivity analysis approach takes care of this aspect by providing more than one estimate of the future return of a project. It is thus superior to one figure forecast since it gives a more precise idea about the variability of the returns.

Usually sensitivity analysis provides information about cash flows under three assumption : (1) Pessimistic (ii) Most likely and (iii) Optimistic outcomes associated with the project. It explains how sensitive the cash flows are under these three different situations. The larger is the difference between the pessimistic and optimistic cash flows, the more risky is the project and vice versa.

**Illustration 3**

ABC Company Limited is attempting to evaluate two mutually exclusive project 'A' and 'B'. Each project requires a net investment of RS. 10000 and the annual cash flows from each of the projects is estimated at Rs. 2000 per annum in the next 15 years. The company's cost of capital may be taken at 10%. The management has made the following optimistic, most likely and pessimistic estimates of the annual cash inflows associated with each of these projects.

Project A	Project A	Project B
Initial investment	Rs. 10000	Rs. 10000
Estimated Cash flows (per annum)		
Pessimistic	1500	----
Most likely	2000	2000
Optimistic	2500	4000



You are required to give your considered opinion for helping the management in arriving at a decision.

**Solution**

In order to arrive at a decision about the selection of a project, the following figures have been ascertained regarding the net present value of cash inflows of each of the projects.

Project A (Initial investment Rs. 10000)

Cash in flows

	For each of the 15 years	Discount factor at 10X	Present value	Net present value
Pessimistic	Rs. 1500	7.606	Rs. 11409	1409
Most likely	2000	7.606	15212	5212
Optimistic	2500	7.606	19015	9051
Project B (Initial investment Rs. 10000)				
Pessimistic				
Most likely	-----	7.606	-----	-10000
Optimistic	2000	7.606	15212	5212
	4000	7.606	30424	20424

The above data indicates that project B is more risky than project A. It will depend upon the management whether they would like to take project A or B depending upon the risky they want to undertake. Project B has a higher risk together with a higher profitability. In case, the management is venturesome, it can go for project B. and in case, it is orthodox, it may go for Project A.

**(b) Probability assignment**

Sensitivity analysis approach as explained above, suffers from a limitation. No doubt, it provides different cash flow estimates under three assumptions, it however does not provide chances of occurrence of each of these estimates. For example, in the illustration given above three possible cash inflows have been given Rs. 500, Rs. 2000 and Rs. 2500 in respect of Project A. The question is these equally likely? A better decision can be made if one can assign appropriate probabilities to each of these estimates. Suppose the probabilities assigned are .20, .60 and .20 respectively, the cash flow as adjusted by probabilities will be as follows :

	Cash inflows	Probabilities	Expected Monetary Values
Pessimistic	1500	.20	300
Most likely	2000	.60	1200
Optimistic	2500	.20	500

The above monetary values give a more precise estimate about the likely cash flows as compared to those estimated without assigning probabilities.

Probabilities means the likelihood of happening an event. When it is said that an event has 1 probability, it means it is bound to happen. In case it has 0 probability, it means it is not going to happen. In case it has 0 probability it means it is not going to happen. In the above

example the chances of having cash flow as Rs. 2000 has a probability of .6 or 60%. In other words, chances of not having cash flow or Rs. 2000 are .4 or 40%.

Probability may be objective or subjective. An objective probability is based on a large number of observations under independent and identical conditions repeated over a period of time. A subjective probability is based on personal judgement since there are no large number of independent and identical observations. In capital budgeting decisions, the probabilities are of a subjective type since they are based on a single event.

The mechanism of assigning probabilities to cash flows for capital budgeting decisions will be clear with the following illustration

#### Illustration 4

The Hypothetical Company Limited has given the following possible cash inflows for two of their projects 'X' and 'Y' out of which one they wish to undertake together with their associated probabilities. Both the projects will required an equal investment of Rs. 5000.

You are requested to give your considered opinion regarding the selection of the project

Possible events	Project X		Project Y	
	Cash in flows	Probability	Cash in flow	Probability
A	Rs.4000	.10	12000	.10
B	5000	.20	10000	.15
C	6000	.40	8000	.50
D	7000	.20	6000	.15
E	8000	.10	4000	.10

#### Solution

#### Computation of Expected Monetary Values for project X and Project 'Y'

Cash Inflows	Probability	Project X		Project Y		
		Expected value	Cash inflows	Probability	Expected value	
A	4000	.10	400	12000	.10	1200
B	5000	.20	1000	10000	.15	1500
C	6000	.40	2400	8000	.50	4000
D	7000	.20	1400	6000	.15	900
E	8000	.10	800	4000	.10	400
	Total		6000	Total		8000

The working given above show that project 'Y' has higher expected monetary value as compared to project 'X'. The monetary value in case of project 'Y' is Rs. 8000 while the expected monetary value in case of project 'X' is Rs. 6000. Thus, project 'Y' is preferable to Project 'X'. Moreover, if monetary values in each of the two cases are discounted at 10% the net present value for project 'X' will be only Rs. 454 (ie Rs. 6000 X .909 - 5000) while in case of project 'Y' the net present value will be Rs. 2272 (ie Rs. 8000 X .909 - 5000)

#### (c) Standard deviation

The probability assignment approach for risk analysis in capital budgeting does not provide the decision maker with a precise value indicating about the variability of cash flows and therefore the risk. This limitation is overcome by adoption of standard deviation approach.



Standard deviation is a measure of dispersion. It may be defined as the square root of squared deviations calculated from the mean. In case of capital budgeting this measure is used to compare the variability of possible cash flows of different projects from their respective mean or expected values. A project having a larger standard deviation will be more risky as compared to a project having smaller standard deviation.

The following steps are taken for calculating the standard deviation of the possible cash flows associated with a project

1. Mean value of possible cash flows is computed
2. Deviations between the mean value and the possible cash flows are found out
3. Deviations are squared
4. Squared deviations are multiplied by the assigned probabilities which give weighted squared deviations
5. The weighted squared deviations are totalled and their square root is found out. The resultant figure is the standard deviation.

**(d) Coefficient of variation**

Standard deviation is an absolute measure. It is unfit for comparison particularly where projects involve different cash outlays or different expected (or mean) values. In such a case, relative measure of dispersion should be calculated. Coefficient of variation is one of such measures. It is calculated as follows :

$$\text{Co-efficient of variation} = \frac{\text{Standard Deviation}}{\text{Expected (or mean) cash flow}} = \frac{\text{---}}{\text{Ecf}}$$

The co-efficient of variation in case of project X and project Y will be calculated as follows.

$$\text{Project X} = \frac{1095}{6000} = 0.1825 \text{ or } 18.25\%$$

$$\text{Project Y} = \frac{2098}{8000} = 0.2623 \text{ or } 26.23\%$$

The coefficient of variation of Project Y is more as compared to project X. Hence, Project Y is more risky. The choice would depend upon the capacity of the investor to bear the risk. Project Y has a higher expected monetary value as compared to project X. Thus, with higher risk the profitability is also higher. In case the investor is not averse to risk, he may accept project Y. However, if he is averse to risk, he will accept Project X.

**(e) Decision tree analysis**

Decision tree analysis is another technique which is helpful in tackling risky capital investment proposals. Decision tree is a graphic display of relationship between a present decision and possible future events, future decisions and their consequences. The sequences of events is mapped out over time in a format resembling branches of a tree. In other words it is a pictorial representation in tree form which indicates the magnitude.

An outstanding feature of decision tree analysis technique is that it links every chronologically with forecasted probabilities and thus given a systematic appearances of decisions and their forecasted results.



### Constructing a Decision tree

The following steps are taken for constructing a decision tree.

#### 1. Definition of the proposal

The proposal is defined ie. What is exactly required under the proposal e.g. enter a new market, introducing a new product line etc.

#### 2. Identification alternatives

Every proposal will have atleast two alternatives – accept or reject. However, there may be more than two alternatives also, For example a firm may be considering the purchase of new plant for manufacturing a new product. It may have four alternatives (1) not to purchase the plant, (2) purchase a large plant, (3) purchase a small plant, or (4) purchase a medium size plant.

#### 3. Graphing the decision tree

The decision tree is then laid down showing decision point (ie. the cash outlay), decision branches (ie alternative available) and other data

#### 4. Forecasting cash flows:

The forecasted cash flows regarding each decision branch are also shown along with the branch. Probabilities are also assigned to each cash flow. Expected values of future returns are calculated and the total expected value for the decision is determined.

#### 5. Evaluating results

Having determined the expected value for each decision, the results are analysed. Some alternatives may look to be acceptable while others may be weak or unacceptable The firm may proceed with the profitable alternatives or may decide to reconsider them because of incomplete data or other reasons.

### Exercise

1. What is the purpose of a capital expenditure budget? How control over expenditure can be effect through this budget?
2. Discuss the methods used for evaluating and raking investment proposals. Make a comparative study of the internal rate of return approach with the 'present value approach' in choosing a capital expenditure project.
3. Several methods are employed by management accountant for ascertaining the profitability of capital expenditure projects. Discuss any one method and explain the salient features thereor.
4. State how you consider the Pay-back method useful for assessing the economic worth of a project
5. (a) Explain 'Discounted Cash Flow method" in ranking investment proposals  
(b) Indicate the main factors to be considered in "Investment decision".
6. Explain the Internal Rate of Return method of project evaluation. In the absence of mutually exclusive investment, projects explain whether or both the IRR and IPV will lead to the same acceptance or rejection decision.
7. Investments alternative yielding the highest discount rate of return is the most acceptable. Will this always be true? Explain
8. :It is the capital expenditure decision that spells the difference between the business success and business failure". Do your agree with the above statement? Substntiate your views with reasons. Also explain the various methods used for evaluation of capital expenditure proposals bringing out their relative merits and demerits.

9. What are the basic components of capital budgeting analysis? Explain the difference between IRR and NPV methods.
10. Explain the salient features of the "Present Value method" of project evaluation and examine its rationality.

### Lesson 9

#### Cost of Capital

##### Meaning, Classification costs of Debt and Preference Share Capitals:

The objectives of this lesson are to enable you to understand and meaning of cost of capital, its importance in financial management, different forms of costs of capital and the classification of costs based on specific sources of capital. Through this lesson you will also be able to calculate the cost of debt and Preference Share Capitals of different business units.

##### Meaning:

The cost of capital is an important concept in formulating a firm's capital structure. It is widely used as the very basis of capital budgeting decisions and evaluating the alternative sources of finance. The cost of capital is usually referred to as the 'cut off' rate. It is a yardstick to assess the acceptability or otherwise of particular capital projects. It is the minimum required rate of earnings for capital expenditure.

It is minimum rate which should be earned by a firm investing its current funds efficiency in long-term activities. In simple language the cost of capital denotes the cost that should be incurred by a firm when it decides to employ various sources of finance such as.

1. Equity Share Capital
2. Preference Share capital
3. Debt Capital and
4. Retained Earnings

In the light of the wealth maximisation objective, the cost of capital can be termed as the rate of return the funds used should produce to justify their use with the firm.

##### Importance

The development of the concept is recent phenomenon. The concept is very important and relevant in the field of managerial decision as this dynamic concept is affected by a company's capital structure, its financing plans for the future and any changes in its rate of earnings.

The main purpose for measuring the cost of capital lies in its importance as a tool of decision criterion in capital budgeting decisions. In case of the net present value method a project will be accepted if it has a positive net present value when the cash flows are discounted at the cost of capital. In this context the cost of capital is the discount rate. In case of internal rate of return method, the project will be accepted if its rate of return is greater than capital. In this situation the cost of capital is treated as the minimum rate of return expected or required on investment projects. The main force behind the investment projects which are being accepted by the firm is the maximisation of the market value per share. The cost of capital indirectly helps the firm to maintain the market value per share at its current level. If the firm earns more than the cost of capital, the market value per share is expected to increase. In this sense, the cost of capital is a target for allocating the firm's funds in profitable manner.



Cost of capital is also significant in designing the capital structure of a firm. The term capital structure is frequently used to indicate the long-term sources of funds employed in a business enterprise. The capital structure influences the cost of capital and any change in the former results in change in the latter and vice versa. Though an optimal capital structure, a firm would be able to minimise the cost of capital and maximise the market value of the firm.

Further, the cost of capital is helpful in evaluation expansion projects, evaluation of the financial performance of the top management through the comparison of the projected overall cost of capital and the actual cost incurred in raising the required funds.

In addition the cost of capital is a vital factor in management decision about the method of financing at a given time. Costs of various sources of capital at a given time influence the management's decision in favour of a certain capital. Moreover the measure of capital is also important in many areas of decision making such as working capital policy, dividend policy, financial plans for the future etc.

#### **Forms of Costs of Capital**

Earlier we have stated that the cost of capital is the minimum rate or return required on new capital projects in order to keep the per share market value unchanged. However there are various concepts of costs of capital which are used in different contexts. Those are given below:

##### **1. Marginal Cost of Capital**

It is average cost of new funds raised by the firm.

##### **2. Specific Cost of Capital**

It is the cost associated with particular component of capital structure

##### **3. Average Cost of Capital**

It is the average of various costs or the weighed average of the costs of each component of funds employed by the concern, the weights being the proportion of each component in the capital structure.

##### **4. Combined Costs of Capital**

It includes the costs of capital from all sources ; debt, equity, preference capitals and retained earnings. It is also called the weighted cost of capital

##### **5. Spot Cost of Capital**

It is the cost prevailing in the market at a certain time.

##### **6. Future Cost of Capital**

It is the projected cost of capital used in designing the capital structure to minimise the future cost of capital and to control it.

##### **7. Opportunity Cost of Capital**

It is the rate of return on other investments available to the firm in addition to the one currently being used.

#### **Classification of Costs Based on Specific Sources of Capital**

Firms use funds from different sources over time. A firm cannot continually finance with debt without having adequate equity base. Similarly it cannot use solely common stock or retained earnings for investment projects. A mix of these sources of capital are used by the firm in order to minimise the Cost of Capital and maximise the wealth of the firm. There are four basic sources of long term funds for the business firm. Those are shown on the left hand side of the balance sheet. The basic sources of long-term funds are long term debt, preferred shares equity firm is expected to have funds from some of these sources in its financial structure. The costs



that are incurred for obtaining these sources are called with specific source name viz. Cost of Debt, Cost of Equity Share Capital, Cost of Preference Share Capital and Cost of Retained Earning. The techniques for measuring the cost of debt and preference share capital and the computation of costs of equity and retained earnings and weighted average cost of capital are given in the following pages. The measurement of cost of capital is most complex and controversial problem in finance area. There are widespread differences as to how these costs should be measured. We examine some of the techniques that are widely used for measuring specific costs of these sources of financing which are presented in the following pages.

### Measurement of Cost of Debt

Long-term Debt debentures and long-term loans. Debentures are debt instruments carrying promises to pay-interest and repay principle on maturity. The cost of debt is the rate of return expected by the lenders. Debentures may be issued at par or at premium or at discount. Debentures are considered to have been issued at par if the sale proceeds are equal to the face value of debenture. Debentures may be sold at a premium (more than the face value) in order to align the actual interest yield with the yields prevailing in the market. Debentures sold for less than their face value, or at a discount, have stated interest rates (coupon rates), below the prevailing rates for similar risks debt instruments. Also the under writing costs and brokerage costs at the time of issue of these debentures reduce the net proceeds from the sale of a debentures at a premium, at a discount or at a par face) value. Only the net proceeds from the sale of debentures are to be considered for calculating the cost of long-term debt.

#### Example

The Xerox company is interested in selling Rs. 10 lakhs worth of 20 year 7 per cent debentures, each with a face value of Rs. 100. Since similar risk debt instruments are yielding more than 6 per cent. The firm must sell the debentures for Rs. 98 in order to compensate for the low coupon rate. The underwriting firm guaranteeing the issue of debentures receive a fee of 2 per cent of the face value of the debenture which is Rs. 2 per debentured bond. The net proceeds to the firm from sale of each debenture are, therefore Rs. 96 (Rs. 98 – Rs. 2)

#### Debt Issue at Par

The market yield on debt is considered as the cost of debt. It is nothing but the rate of interest on debt before tax. For example, if the above concern sells a new issue of 6 per cent 20 year debentures to raise Rs. 10 lakhs and realises the full face value Rs. 100, the before tax cost would be 6 per cent.

$$\text{Before tax cost of Debt Capital K1} = \frac{\text{Interest}}{\text{Principal}} = \frac{60000}{1000000} \times 10 = 6\%$$

Before tax cost of debt, i.e. this example, is equal to the rate or interest or the return earned by the lenders. The main point to be noted while employing debt capital is that the common shareholders earnings are not diluted. To avoid this the earnings of the firm should be equal to or greater than the interest rate.

From the figure it is clear that the firm will be able to maximise its share value upto the point X where the rate to return intersects the cost of debt line, K. To some extent the cost of debt will be uniform. But after a certain level it increases whereas the rate of return decreases with the successive investment projects. If the firm employ X 2 amount of funds, then cost tends to increase as the rate of interest is more than the return from investment. Therefore, it results in dilution of the shareholders, earnings. Thus the market value per share will be affected adversely. This is demonstrated below in the example.

**Example**

The Xerox company has sales of Rs. 10 lakhs operating cost of Rs. 9 lakhs and no debt. The Company's marginal income tax rate is 55 per cent. Its income statement is shown in the BEFORE column below. Then it borrows Rs. 1 lakh at 6 per cent and invests the funds in assets whose use causes sales to rise by Rs. 70000 and operating expenses by Rs. 10000. Hence profits interest rises by Rs. 60000. The new situation is shown in the AFTER column. Earnings after taxes are unchanged as the investment just earns its cost of debt capital.

Income Statements	Before Rs.	After Rs.
Sales	100000	1070000
Operating costs	900000	910000
	-----	-----
Earnings before interest and taxes (EBIT)	100000	160000
Interest	---	60000
	-----	-----
Earnings Before Tax (EBT)	100000	100000
Taxes @ 55%	55000	55000
	-----	-----
Earnings After Tax (EAT)	45000	45000
	-----	-----

If the above firm earns less than Rs. 160000 after the new investment, the earnings to shareholders will be reduced and as a result per share earnings decline.

The cost of debt which we have seen earlier is before tax-cost. But interest is allowed as a deductible expenditure for the purpose of calculating income tax on firm's net earnings. Therefore, the cost of debt should be calculated after-tax only. Higher the interest charges, lower will be the amount of tax payable by the firm. As a result the after tax cost of debt would be lower than the before tax cost of debt. Thus, in the case of profitable concerns the cost of debt is the contractual interest rate adjusted further for tax liability of the firm, in the case of unprofitable concerns, the true cost of debt is the before tax cost. The after tax cost of debt =  $(K(1 - t))$

Where  $t$  is the tax rate.

Suppose the Xerox Company issues 6% debentures at face value Rs. 100 and its marginal income tax rate is 55 per cent the effective cost of debentures will be :

$$K_1 = 6.00 (1 - 0.55) = 6 \times 0.45 = 2.7\%$$

In the calculation of average cost of capital, it is the after tax cost of debt which should be used and not the before tax cost. We note that the 2.7 per cent after tax cost in our example represents the marginal or incremental cost of additional debt. It does not represent the cost of debt already employed. In view of tax deductibility, the explicit cost of debt is considerably cheaper than the cost of another source of financing having the same  $K$  but where the financial charges are not deductible for tax purpose.

**Debt issued at a Premium or Discount**

Debenture bonds may be issued to the public at a price which differs from the face value. The sale value may be more or less than the face value. In both the cases, the yield on debt

will not be equal to the coupon rate of interest. If the debentures are issued at premium or discount, the formula for calculating its cost is as follows.

$$\text{After tax cost of debt} = \frac{(1-t) \left[ R + \frac{1}{n}(F-P) \right]}{\frac{1}{2}(F+P)}$$

Where F = Face value

P = Price at which the debentures is sold,

N = Number of years to maturity

R = Fixed interest charges

$\frac{1}{n}(F+P)$  – Amortisation of premium or discount

**Example**

Suppose the Xerox company sells its 20 year debentures at Rs. 90 each, whose face value is Rs. 100. The coupon rate of interest is 6% and the marginal tax rate 0.55% the after tax cost of debt is :

$$\begin{aligned} & \frac{(1-0.55) \left[ 6 + \frac{1}{20}(100-90) \right]}{\frac{1}{2}(90+100)} \\ &= \frac{0.45 \left[ 6 + \frac{1}{20}(10) \right]}{\frac{1}{2}(190)} \\ &= 0.45 \times \frac{6.5}{95} = 3.08\% \end{aligned}$$

**Example**

Suppose the Xerox company sells its 20 year debentures of Rs. 100 at Rs. 110 each (i.e. at 10% premium) If the coupon rate of interest is 6% and the marginal tax rate is 0.55% the after tax cost of debt is :

$$\begin{aligned} & \frac{(1-0.55) \left[ 6 + \frac{1}{20}(100-110) \right]}{\frac{1}{2}(110+100)} \\ &= \frac{0.45 \left[ 6 + \frac{1}{20}(10) \right]}{\frac{1}{2}(210)} \\ &= 0.45 \times \frac{6.5}{105} = 2.79\% \end{aligned}$$



**Perpetual Debt**

Sometimes firms may issue debentures which are irredeemable. In such a case the debenture capital forms as a permanent source of firms capital. The cost of debt in such circumstances may be calculated by dividing the price at which the bond is sold into fixed interest charges, adjusted for tax effect.

$$\text{After tax cost of debt} = \frac{R}{P} (1-t)$$

Where R = Coupon rate of interest

T = Tax rate,

P = Price at which the bond or debenture is sold

**Example**

The Xerox company issues 6% irredeemable debentures of Rs. 90 each and the tax rate is 55% The cost of debt is

$$= \frac{6}{90} (1 - 0.55)$$

$$\text{After cost of debt} = \frac{6}{90} \times 0.45 = 3\%$$

**Cost of Preference Capital**

Preference share capital represent a special type of ownership interest in the firm. Preferred shareholders must receive their stated dividends prior to the distribution of any earnings to equity shareholders. Since preference share is a form of ownership and a business firm is viewed as a going concern the proceeds from the sale of preference shares are expected to be held for an indefinite period of time. Though it is not compulsory for the firm to pay dividend on preference shares except for cumulative preference shares, just to avoid complications, it is generally paid. Otherwise the firm's credit standing may be damaged. Therefore the dividend on preference shares is a fixed cost to the firm like interest on debt. Their rate of dividend per share is fixed well in advance at the time of the issue. So the cost of preference share capital,  $K_p$  is found by dividing the annual preference share dividend,  $d_p$ , by the net proceeds from the sales of preference shares,  $N_p$ . The net proceeds represents the amount of money to be received net of any underwriting or sales expenses to market the stock. For example, if a preference share is sold at Rs. 100 per share on which Rs. 3 is paid as underwriting commission, the net proceeds from sales are Rs. 97. The formula for calculating the cost of preference share capital is:

$$K_p = \frac{D_p}{N_p}$$

Since the preference share dividends are paid out of the firm's after tax cash flows, a tax adjustment is not required. Therefore, the cost of preference share capital is greater than the cost of debt.

**Example**

The Xerox company is contemplating an issue of 8 per cent preference shares of Rs. 90 at Rs. 85 each. The cost of issuing and marketing the shares is Rs. 3 per share. The cost of preference share capital is

$$K_p = \frac{7.20}{82} = 8.78\%$$

Here the annual dividend,  $d_p$  is Rs. 7.20 (i.e. 8% of Rs. 90) and the net proceeds Rs. 82 is obtained after deducting Rs. 3 from Rs. 85. If the dividend on the preference shares of Xerox Company had been stated in rupees, the calculations would have been greatly simplified since the rupee dividend could have been substituted into the above formula.

#### Example

The Xerox Company issues Rs. 8 preference share capital which is irredeemable. The face value of share is Rs. 100 but they are issued at Rs. 105. The cost of issuing and marketing the share is Rs. 3 per share. Calculate the cost of preference share capital

Formula for finding cost of preference share capital is :

$$K_p = \frac{d_p}{N_p}$$

In this problem,  $d_p = \text{Rs. } 8$

$$N_p = \text{Rs. } 105 - 3 = \text{Rs. } 102$$

$$\text{Therefore, } K_p = \frac{8}{102} = 7.84\%$$

#### Cost of Equity share capital

The cost of equity share capital is not nearly as easy to calculate as either the cost of debt or the cost of preference share capital. The rate of dividend on equity share is not fixed like the interest rate on debt or dividend on preference shares. The income from equity investments, i.e. dividends, depends on the level of profits and the dividend influences the market value of equity shares. The cost of equity capital is the minimum rate of return that a company must earn on the equity financed portion of its investments in order to maintain the market price of the equity share at the current level. In other words, the required rate of return which equates the present value or the expected dividends with the market value of share is the cost of equity capital.

The cost of equity capital includes the cost of external equity or the new issue of ordinary shares and the retained earnings. There are two important factors to be considered while calculating the cost of equity capital. They are (1) Unpredictable nature of futures dividends and (2) The nature of earnings and dividends, unlike the interest on debt or the dividend on preference share, are expected to grow.

Further with the maximisation of shareholders welfare as the main objective, the management should ensure that the existing shareholders are well off in respect of the expected return on their investment and the market value of shares, as they were before. While raising funds through the issue of equity shares for any new investment project, the expected return from the investment should be computed, as the insufficiency of the return to meet the cost of capital results in dilution of equity shareholders share. The company should not issue the new equity shares, if the new investment does not generate sufficient earnings.

There are several approaches for computing the cost of equity share. They are :

1. D/P Ratio approach
2. E/P + Growth approach

3. E/P Ratio approach

4. Realised yield approach

### 1. Dividend-Price Ratio (D/P Approach)

Under this approach the return represents what investors expect when they invest savings in a company.

$$K_e = \frac{D}{P}$$

Where

- $K_e$  = Cost of equity shares
- D = Current dividend rate
- P = Current market price of equity shares

#### Example

The Xerox company has issued 50000 equity shares of Rs. 100, each, the current market price being Rs. 90 and the dividend rate Rs. 4.50. Calculate the cost of equity capital.

$$\text{Applying the formula } K_e = \frac{D}{P} = \frac{4.5}{90} = 5\%$$

is the cost.

From the above example, it is clear that the cost of capital is an important factor in determining the market price of the equity capital.

$$\text{Since } K_e = \frac{D}{P} \quad P = \frac{D}{K_e}$$

Though it is compulsory on the part of the management to declare dividend on equity shares to maintain the market price of equity shares at the current level, the declaration becomes indispensable.

This method has got three limitations. They are :

1. It ignores the earnings on retained earnings.
2. It ignores the fact that market price changes may be due to retained earnings also and not on account of high dividend, and
3. The growth of the firm

### 2. D/P + Growth Approach

Under this approach the expected rate of return has to be higher than the present earnings per share relative to present market value per share as the earnings and dividends or ordinary share capital are generally expected to grow.

Therefore,

$$K_e = \frac{D}{P} + G$$

Where  $K_e$  = Cost of equity share,  
 D = Current dividend rate,  
 P = Current market price of share  
 G = Expected growth rate of returns



**Example**

The Xerox company has issued 5000 equity shares of Rs. 100 each. Its current market price is Rs. 95 and the current dividend rate is Rs. 4.50 per share. The dividends are expected to grow at a rate of 8%; Compute the cost of equity capital.

$$K_e = \frac{4.5}{95} + 8\%$$

$$= 4.74 + 8\% = 12.74\%$$

The cost of equity is thus the current yield plus the growth rate. This approach is based on certain assumptions. They are :

1. The market value of the share is a function of the expected dividends.
2. The initial dividend is greater than zero
3. The growth rate of dividend is constant for ever
4. The dividend pay-out ratio is constant.

The main limitation of this approach is the difficulty in determining or predicting the expected rate of return by a shareholder.

The above formula is to be altered whenever there are cost of issue or floatation costs. Such costs include the brokerage fees, commission for underwriting of shares etc. The net proceeds expected to be realised by the company would be the market price less the floatation cost of equity. If the company pays  $f$  fraction of the share price as floatations costs, the cost of new issue of ordinary shares will be :

$$K_e = \frac{D}{P(1-f)}$$

It is quite important that the cost of ordinary share be adjusted for any under pricing or underwriting cost is determining the cost of new issues will be greater than the cost of existing issues as long as ' $f$ ' in the above equation is greater than zero

**Example**

The Xerox company has issued 5000 equity shares of Rs. 100 each. The market price of the share is Rs. 110. The current dividend rate is Rs. 5 per share and they are expected to grow at the rate of 4 per cent. The cost of floatation for the issue is Rs. 2.50 per share. Compute the cost of new equity share capital

$$K_e = \frac{D}{P(1-f)} + G$$

Where  $D = \text{Rs. } 5$   
 $P = \text{Rs. } 110$   
 $F = \text{Rs. } 2.50 \text{ per share or } 2.77\%$   
 $G = 4\%$

$$K_e = \frac{\text{Rs. } 5.00}{\text{Rs. } 110 (1 - 0.0277)} + 0.04$$

$$\begin{aligned}
 &= \frac{\text{Rs. 5}}{\text{Rs. 106.953}} + 0.04 \\
 &= 0.0467 + 0.04 + 0.0867 \\
 &= 8.67\%
 \end{aligned}$$

### 3. Earnings price (E/P) Ratio approach

This ratio represents the relationship between earnings and market price of shares. This approach is based on the three conditions. They are

1. The firm does not employ debt.
2. The dividend pay out is 100 per cent or in other words, the retained earnings is equal to zero
3. The earnings of the firm are stable which implies a zero growth rate ( $g=0$ )

$$K_e = \frac{E}{P}$$

The limitations of this approach are :

1. All earnings are not distributed to shareholders in the form of dividends
2. Earning per share cannot be constant and
3. Share price also does not remain constant

The earning-price ratio is a valid measure in case of a stable or expanding firm and growing firm. Adjustment regarding the flotation cost should be made when using E/P for measuring the cost of new issue of equity shares.

#### Example

The Xerox company is contemplating to raise Rs. 5 lakhs through the issue of equity shares. The company has already issued 1000 equity shares of Rs. 100 each which is currently earning Rs. 150000 per year. The new issue can be made at the current market price of Rs. 112 on which the flotation costs would be Rs. 3 per share. Compute the cost of new equity capital issue assuming that there is no debt and the earnings are stable

If E/P ratio is used to measure the cost of equity, the formula is :

$$K_e = \frac{E}{P}$$

Where E = Earning per share

P = Net proceeds from sale of share

$$\begin{aligned}
 \text{Earnings per share} &= \frac{150000}{10000} = \text{Rs. 15} \\
 &= \text{Rs. 112} - 3 = \text{Rs. 109}
 \end{aligned}$$

Net proceeds per share = Market price – flotation costs.

$$\begin{aligned}
 K_e &= \frac{\text{Rs. 15}}{\text{Rs. 109}} = 0.1376 \text{ or } 13.76\%
 \end{aligned}$$

#### 4. Realised Yield Approach

This approach is based on the rate of return actually realised for a period of time by investors in a particular company. If Rs. 5 is paid as dividend on equity shares, it is the cost of equity.

The cost of equity capital is normally greater than any other long-term financing cost. Since equity share dividends are paid from after-tax cash flows, no tax adjustments is required.

#### Cost of Retained Earnings

The cost of retained earnings is closely related to the cost of equity shares. If earnings are not retained, they would be paid out to the equity shareholders as dividends. Often the retained earnings are looked on as a fully subscribed issue of equity shares, since they increase the stockholders equity in the same way that a new issue of equity shares would. The cost of retained earnings must therefore be viewed as the opportunity cost of the foregone dividends to the existing shareholders.

In determining the cost of retained earnings it is necessary to look at the alternative uses of funds. For what purposes other than reinvestment within the company could they be employed? On the other hand, they might be paid out to shareholders in the form of dividends. On the other hand, these funds might be employed to purchase a majority control in the assets of another company.

These approaches result in differences of treatment due to the fact that dividends paid to shareholders are taxable. For example, assume a company with a cost of equity capital of 10 per cent. The firm strives to achieve a minimum rate of at least 10 per cent. Under the dividend approach to cost of retained earnings, it is necessary to calculate the rate at which shareholders would have to invest any dividends received in order to equal the 10 per cent that the corporation could earn on the same funds.

This rate would depend upon the tax bracket of the shareholder. Thus, if his income were low and was in the 20 percent bracket, he would first have to pay tax of 20 per cent on the dividends received from the corporation and then invest the net proceeds at a rate sufficiently high so that he would receive a return of 10 per cent after paying 20 per cent tax on the income received.

On this basis, the cost of retained earnings would be 12.5 per cent.

$$\left[ \frac{\text{Rs.10}}{\text{Rs.100}-20} \right]$$

But this cost would vary with the shareholder's tax bracket. If the shareholder is in the bracket of 50 per cent, the cost of retained earnings would be 20 per cent.

$$\left[ \frac{\text{Rs.10}}{\text{Rs.100}-50} \right]$$

Therefore, the cost of retained earnings

$$K_r = K_e (1-T) (1-B)$$

Where  $K_r$  = Cost of retained earnings

$K_e$  = Cost of equity capital (either D/P or D/E approach)



T = Marginal tax rate of shareholder

B = Brokerage commission to acquire new shares

The value of  $K_r$  is thus fractionally less than the value of  $K_e$ . But it is difficult to get average tax rate and brokerage costs of a company's shareholders.

#### Example

The cost of equity capital for Xerox Company is 8.678 per cent. The average tax rate of its shareholders is 25 per cent and the brokerage costs amount to 13 per cent. Find out the cost of retained earnings.

Substituting the appropriate values into above equation we get

$$\begin{aligned} K_r &= 0.0867 (1-0.25) (1-0.03) \\ &= 0.0867 (0.75) (0.97) \\ &= 0.0631 \\ &= 6.31\% \end{aligned}$$

In the above example, the shareholders should be able to earn at least 6.31% as dividend on his new investment which in turn equal 8.67 % equity cost of his old company.

The second approach to estimate the cost of retained earnings is the external yield on external investment. The company should invest these funds in an external investment which offers an income risk package similar to its own existing assets. The line of approach suggests cost of retained earnings is equal to the cost of equity capital.

Instead of looking at this possible alternative uses of funds provided by retained earnings. We might shift to a consideration of the sources of funds. Assume that the corporation had paid out all its earnings as dividends. In order to obtain the amount of funds equal to the undistributed earnings that it would otherwise have had the corporation would have to undertake new financing. If this were in the form of new equity capital, the cost would be our assumed 10 per cent cost of equity capital. Since virtually all companies rely primarily on equity sources of capital. We are inclined to favour this point of view, which means that the cost of retained earnings is the same as the cost of financing by means of equity shares.

One may question the reason for choosing the retained earnings to equity share issue by the companies when the cost of new equity issue is same as that of retained earnings. The reason begin the matter of convenience and it does not involve any floating costs and at the same time gets all the advantages of equity. When retained earnings are use the uncertainties of a public financing are eliminated, the delay caused by the preparation of registration statements and prospectuses is avoided and the difficulty of gauging market conditions by passed. Management simply uses funds as part of its recovering activities. It does not draw fine lines of distinction between funds obtained from retained earnings. In effect, they both represent capital to be invested in the same type of projects at similar rates. Finally, as a matter of practice, if the overall rate of return is determined by using the market value of common stock. The need for determining a separate rate for retained earnings disappears as both the weighing factor and rate of return are embodied in market values.

Some managements regard retained earnings as cost free. Since internal sources of funds are much more important to corporations than equity funds raised externally, it becomes a matter of considerable importance whether or not to attach a cost or retained earnings.

Managements which assign no cost, or a low cost to internally generated funds may, as a result, undertake projects which they would not attempt if they had to raise equity capital

externally or if they had correctly calculated their combined cost of capital attributing to retained earnings the same cost as to equity raised externally.

The weighted average cost of capital is found by weighing the cost of each specific type of capital by the historical or marginal proportions of each type of capital uses. Historical weights are based on the firm existing capital structure, where as marginal weights consider the actual proportions of each type of financing expected to be used in financing a given project.

#### **Weighted Average cost of capital Based on Historical Costs**

This is the most common method used for finding out the overall cost of capital. Under this method, the historical weights of capital used by the firm are used. The use of these weights is based on the assumption that the firm's existing mix of funds in the capital structure is optimal and therefore should be maintained in the future also. There are two types of historical weights that are used in the calculation of weighted average cost of capital. They are book value weights and market value weights.

Whatever method is used for calculating the average cost of capital, whether historical or marginal the following steps are usually involved.

1. Calculate the cost of specific source of funds such as cost of debt, cost of preference, cost of equity and cost of retained earnings.
2. Multiply the cost of each source by its weight which is obtained in proportion to the total capital
3. Add these weighted costs from all the resources of fund to arrive at the weighted average cost of capital.

In the financial decision making, the cost of capital should be computed on an after-tax basis. Hence the specific costs to be used to measure the weighted cost of capital must be the after tax costs.

#### **Book Value Weight**

Here book values of different sources of capital already in use are considered for the purposes of obtaining the proportions in which they are used. These proportions of each source to the total funds are used as weights for calculating weighted average cost of capital. The use of book value weights in calculating the firm weighted average cost of capital assumes that new financing will be raised using exactly the same proportion of each type of financing as the firm currently has in its capital structure.

#### **Example**

The specific costs and the book values of various types of capitals used by Xerox Company are as follows :

Source of capital	Book value	Cost
Debt	1500000	2.79%
Preference shares	1000000	7.84%
Equity shares	2000000	8.67%
Retained earnings	50000	8.21%

Calculate the weight average cost of capital using book value weight

The weighted average cost of capital for the Xerox company based on book value weights and the values used in its calculations



Source of Capital	Book value Rs. (1)	Percentage of each to total % (2)	Cost % (3)	Weighted cost (2) X (3) (4)
Debt capital	1500000	30.00%	2.79%	0.837%
Preference capital	1000000	30.00%	7.4%	1.568%
Equity Shares	2000000	40.00%	8.67%	3.468%
Retained Earnings	500000	10.00%	8.31%	0.831%

The weighted average cost of capital of Xerox company based on book values, is 6.704%

#### Market Value Weights

Since the market values reflect the expectations of investors, market value weights may be preferred to book value weights while calculating weighted average cost of capital. Also the market values of the securities closely approximate the actual amount to be received from their sale. Moreover, since the cost of various types of capital are calculated using prevailing market prices, it seems only reasonable to use market weights too. However, it is more difficult to calculate the market values of a firm's sources of capital than to use book values. It is particularly difficult to allocate a market value to the firm's retained earnings. The weighted average cost of capital based on book value weights since most equity shares and preference shares have market values considerably greater than their book values. Since these sources of funds have higher specific costs, the overall cost of capital increases.

#### Example

Using the costs given in the earlier example, calculate the weighted average cost of capital of Xerox company when the market values of different capital are as follows:

	Rs.
Debt capital	1500000
Preference capital	1500000
Equity share capital	4000000
Retained earnings	1000000
	-----
	8000000
	-----

#### Weighted Average Cost of Capital based on Market Values

Source of Capital	Market value Rs. (1)	Percentage of each to total % (2)	Cost % (3)	Weighted cost (2) X (3) (4)
Debt capital	1500000	18.9 %	2.79%	0.525%
preference capital	1500000	18.8%	7.84%	1.474%
Equity Shares	4000000	50.0%	8.67%	4.335%
Retained Earnings	1000000	12.4%	8.31%	1.035%
	8000000	100.0%		7.369%



They weighted average cost of capital based on market value weights of Xerox company is 7.369% which is greater than book value weighted average cost of capital 6.704%. If the book value weighted average cost of capital is used the firm may have to accept projects that would be unacceptable based on the market value approach. But the book value weights are used by many firms because of the following reasons.

1. Firms set their capital structure targets in terms of book value.
2. Book value information can be readily derived from the published information and
3. Investors normally use book value debt-equity ratios to evaluate the reiskiness of the firms.

#### **Weighted Average Cost of Capital based on Marginal Weight**

Cost of capital is significantly used in the selection of new projects by the firms and not with those under execution. Therefore, the relevant cost to be worked is the cost of raising new funds to finance the projects, not the historical cost which has been incurred in the past. Hence the weighted average cost of new capital issue of the project is more relevant than the one based on historical weights. The use of marginal weights involves weighing the specific cost of various types of financing by the percentage of the total financing expected to be raised. In using the marginal weights, we are concerned with the actual amounts of each type of financing used whereas in using historical costs our assumption is that the proportion of each type of financing in the firm's capital structure would remain the same. The use of marginal weights is more attuned to the actual process of financing projects. It recognises that funds are actually raised in discrete amounts using the various sources of funds.

This method does not consider the long-term implications of the firm's current financing. But all capital expenditures are long-term investments and therefore the firm should have long-term financing strategy. If the firm uses cheaper debt capital for the current project, the future project may have to be financed with equity share capital. For example, for the current project which is expected to give a return of 6 per cent, the firm may obtain funds by selling debentures at 5 per cent. But in the next year if the firm has to raise funds through equity, it has to offer, say 9 per cent return in view of increased financial risk which makes the firm to reject a project offering 8 per cent return. But if the weighted average cost of capital to the firm, say 7 per cent return will be rejected and the 8 per cent project will be accepted. Although the firm raises funds in lumps, the use of historical weights to calculate the overall weighted average cost of a firm's capital structure is more consistent with the firm's long-term goal of maximising its owners wealth. That is why most of the firms use historical market value weights while calculating their overall cost of capital.

#### **Example**

The Xerox company whose specific costs of capitals are given in the previous example, is contemplating to raise Rs. 10 lakhs for plant expansion. They estimate that Rs. 2 lakhs will be available from retained earnings and intend to sell Rs. 6 lakhs worth of debentures and Rs. 2 lakhs worth of preference shares to raise the remaining Rs. 8 lakhs. Calculate the firm's weighted average cost of capital based on marginal weights.

**Weighted average cost of capital for the Xerox and company based on Marginal Weights**

Source of capital	Amount Rs.	Percentage to Total	Cost %	Weighted cost (2) X (3)
Debt capital	600000	60%	2.79%	1.674%
Preference Capital	200000	20%	7.84%	1.568%
Retained Earnings	200000	20%	8.31%	1.662%
	1000000	100%		4.904%

Weighted average cost of capital = 4.904%

The cost of capital obtained here is less than the average cost of capital calculated using either type of historical weights. This is because of the small amount of more expensive preference shares and retained earnings used. In view of the excessive use of debt financing the firm may have to use expensive equity financing for future projects, as it has to maintain proper equity base.

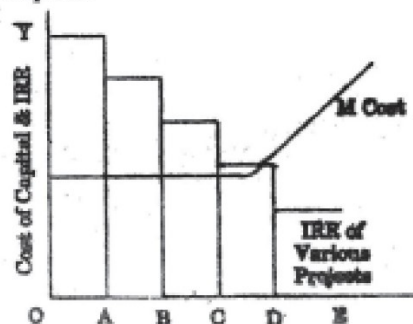
**Marginal Cost of Capital Approach to Capital Expenditure Decision**

The marginal cost of capital to the firm can be measured by determining for various amounts of financing the associated weighted average cost of capital for the desired capital structure. As the firm attempts to raise large amounts of financing, the weighted average cost of the financing is expected to increase. The relationship between the amount of financing raised and the associated weighted average can be used to develop a marginal cost of capital function.

The marginal cost of capital function indicates the weighted average cost of funds, taking into account the fact that raising more than a certain amount of a given type of financing may cause the cost of that type of financing to rise, thereby raising the firms weighted average cost of capital for all levels of financing.

Marginal cost of capital may be used for determining the group of acceptable capital expenditure projects.

The weighted average cost of capital is expected to increase as the firm raises funds. The increase in weighted average cost of capital due to increased financing is called marginal cost of capital. While considering the marginal cost of capital in capital budgeting decisions, one has to take the internal rate of return (IRR) of the various projects. If IRR is greater than marginal cost of capital, the project can be accepted.



Chart

In the above figure, it is found that projects A, B and C can be accepted as their IRR is greater than the respective marginal cost of capital. Project D cannot be accepted as its IRR is less than the cost of capital.



### **Leverage and Cost of Capital**

The financial manager can, within limits, cause his firm's cost of capital to rise or fall. If he starts with an all equity structure, adding debt to a limited extent will bring down the combined or average cost of capital. As debt is added, the leverage ratio rises and the after-tax combined cost of capital falls. Of course the financial manager can achieve this effect in the range from pure equity to the optimal capital structure. Within this range, lower cost of debt increments are being averaged in with higher cost of equity, thus not only reducing the overall cost of capital but also maximising the wealth of the firm.

#### **Exercise**

1. What is meant by the cost of capital for a firm? How do you ascertain the after tax cost of long-term debt?
2. How would one calculate the cost of preference share capital? Why do we concern ourselves with the net proceeds from the sale of the shares instead of the sale price?
3. Explain the term cost of capital. What are the different concepts of capital? Briefly explain the importance of cost of capital in financial management
4. In view of tax deductibility, the explicit cost of debt is considerably higher than the cost of another source of financing. Elucidate with examples.
5. Explain the different approaches for measuring the cost of equity share capital
6. Why, if retained earnings are viewed as a fully subscribed issue of shares, is the cost of financing a project with retained earnings technically less than the cost of using a new issue of equity shares?
7. How is the weighted average cost of capital calculated? What weights should be used in its calculation?
8. What are the pros and cons of using marginal as opposed to historical weights for calculating the weighted average cost of capital? Why is the use of historical weights more consistent with the firm's goal of wealth maximisation?

### **Lesson 10**

#### **Social Accounting and Cost benefit Analysis**

##### **Social Accounting – Meaning**

This relatively new concept extends beyond the traditional accounting definition of profit and loss. While a company takes an action, profit or loss is usually denoted as the differential of the benefits derived and the cost of benefits. No consideration is given to the damage it makes to the surrounding community. For example, let us suppose that a giant company transfers one of its big plants from one state to another. The operation most probably would yield the transferring company a higher profit. But looking beyond, one can find traces of serious damage in the community left behind. Cost of this damage in the form of social expenses may offset the profit more than proportionately in the long run. These social expenses are paid in some other form or by someone else. Some families may need relief money. Mortgages or debts in the community go unpaid or partly paid. The institutions which bear these expenses are the government banks, traders and the creditors. If these expenses were added up, it might have tremendously negative impact on profit estimate by the company. In fact what appears to be a profitable decision might turn out to be loss under the social accounting system. Here says "We need to re-evaluate our accounting procedures when we deal with nature. In our traditional dealings with nature, we have maintained that whatever we take from it is something that is



given free. We calculate only human labour and goods previously reduced to ownership as costs but we do not take into account changes that the human activity might be levying upon either the life systems of the physical conditions in the milieu around the exploitative activity. Along with this tradition goes industry's short sighted notion that technology and solutions that would be the least harmful to nature are necessarily the most expensive. Consequently, instead of developing new, imaginative and profitable means of need satisfaction too many companies channel their valuable resources towards fighting the public. The problem is not limited to large businessmen alone. Even small business management tends to lose a great deal by desperately clinging to such notions. This rationale clearly points out the necessity of a broader, wider and socially responsible perspective on the part of tomorrow's managers. This kind of a crisis might be avoided by sound financial planning under the framework of internal and external environment on a mutually advantageous setting. In other words, the state (or the government authorities in the surrounding community) might make arrangements for tax relief of government orders in order to contribute to the organizational profit so as to prevent community damage. It should also be noted that the concept of social accounting is not opposed to the organizational economic objectives. It only intends to convey that economic or financial objectives of any organization should also reflect the value system agreed upon by the environmental inhabitants and other forces. Apparently this concept may appear to be a curb on the organizational bureaucracy, but sooner or later, tomorrow's enlightened public and the environmental inhabitants would demand social accountability of every corporate action.

The concept of Social Accounting is of a recent origin. It finds its origin from the philosophy of social responsibility of business which has become a widely accepted notion in the business world these days. A variety of terms are in vogue to convey this meaning. "Social Accounting", "Social Reporting", "Social Information System", "Social Disclosure", "Social Responsibility accounting", "Social-economic Accounting" are some of the example of the jaggery of terms used in this sphere. All these terms are usable as synonymous.

"Social Accounting" is the dimension of the art and the science of accounting in the field of social sciences. According to Kohler's Dictionary for Accountants, "Social Accounting is the application of double-entry book keeping to socio-economic analysis it is concerned with the construction, estimation and analysis of national or international income, national or international balance –sheets and the design of the system of component accounts.

According to Epstein, Flamoltz and McDonough "Social Accounting is an extension of the traditional concept of accounting and accountability to a different domain – social rather than financial performance. In this context they consider that a need exists for the application of measurement techniques where they do exist and the development of new measurement techniques where no satisfactory ones are presently available.

The world social accounting used at micro level refers to cost / benefit measurement and reporting of a firm's social programme and general activities. According to K.S. Mathur, The concept of social accounting is of recent origin and is studied in the context of measuring and reporting on the impact of a business firm upon society and the typical environment. It includes the cost-benefit measurement and reporting of a firm's social programme and general activity.

Broadly speaking, the concept of social cost is developed in economics and sociology. In micro-economic theory, social costs arises in three ways. First, monopoly profits are viewed as confiscation of social welfares. Second, imperfect competition may reduce performance by

reducing progressiveness, restricting choice or leading to excess capacity. Finally the market may not reflect public interest in preserving the environment or in solving social problems.

While need for measuring and reporting social performance of business enterprises is pressing, any evidence of comprehensive accounting hardly exists. Again, while as early usage focussed on employees' attitudes towards their employers, subsequent refinements were discovered through improved rating system for use of investors on such dimensions as consumerism, environmental, protection, minority groups working, defence programmes, etc. Difficulties in obtaining useful data limit the practical orientation of such programme. A less synthetic approach relates to inventory management and reporting on a company' activities in specific areas of social concern.

In 1971, the Public Affairs council (Washington) prepared a checklist of objective tasks and activities which on effective integration might identify areas of social responsibility. Later, close on the heels of the objectives set forth in the PAC report, David F. Fetyko suggested a workable format based on the following approaches:

- a) Inventory Approach whereby company's social activities are prepared
- b) Cost or Outlay Approach whereby expenditure incurred on each activity is disclosed
- c) Programme Management Approach whereby in addition to the above two disclosures, a statement regarding compliance with reports activity wise or otherwise is recorded.
- d) Benefit - Cost Approach whereby real worth, that is, benefit of each expenditure is indicated.

In imparting management orientation to the management of behaviour and responsibility a few difficulties surface on the ground. Since specific definitions for social responsibilities and constituencies are materially non existent or derivated with high degree approximations, a practical bias. The following have been suggested in this regard.

- a) Dividing "social responsibility" into identifiable components
- b) Assigning relative weights and priorities to various elements
- c) Entrusting responsibility for overseeing performance
- d) Setting up a variety of goals and operating methods to comply with new criteria thus put up.

Alongwith, these, management accounting has peaked to lofty standards and principles in financial management. A vast scope still exists for furthering improvements in this rather sophisticated area. In reality, very little has been done in regard to accounting for social assets, liabilities and efforts. In an attempt to break new grounds and cover up deficiencies in this regards, some tentative goals have been suggested by the Committee on Social Measurement of the American Institute of Certified Public Accounts.

- a) **Helping business make plans and formulate decision to take external social impact into account**
- b) **Helping business make its own pro-bono publico expenditures more productive**
- c) **Reporting to business various constituents, including government regulatory agencies on its performance as a corporate citizen**
- d) **Enabling investors, if and when they desire to take social responsibility into account in selecting their financial portfolios**

A more practical approach has been devised by Clair, Star (Stanford, USA 1971) In that, rating should be based on community preferences relating to that of other companies in its



sophisticated because of weaker statistical support in obtaining feedback. In this respect, the Abt Associates Annual Report (Innovation, January 1977) appears to have an edge over others. Here Clark Abt reports things that are owned by society as a result of company operation. Under this system, that is, "social income system" which includes not benefit to stress internal return developed in conventional way, is integrated into a net social return and in case the latter is zero or negative, education is that the corporation is paying necessary social rent and, in the reverse, it is levying the social cost in the course of its existence.

A number of studies have thus been made to develop systematic approach towards social accounting in an effort to make it more practiceoriented and thereby evaluate social environmental impact that various models constitute both generalising and capital budgeting aiming at greater conceptualisation and measurement of social welfare and requiring sophisticated quantification. With this end in view, formal cost benefit analysis as conveniently applied in public sector decision making must transcend economic variables and seriously admit some sort or responsibility accounting with regard to social assets, liability and efforts.

Accounting principles and practices underwent several changes with the changed requirement of the business world. The changes in the forms of business organisations, particularly the inception of corporate form of organisation, has rendered the proprietary theory of accounting obsolete and transformed the proprietor into a shareholder with a residual interest, limited liability and reduced involvement. This necessitated maintenance of proper records presenting them in a manner as desired by legislative requirements. Need was also felt that the activities of the enterprises are reported in such a manner that the requirements of various parties (like shareholders, creditors, perspective investors, public and the government bodies) are fulfilled. So far as the financial performance of the enterprises is concerned the annual financial statements (annual profit and loss account and balance sheet) are being used to exhibit the position. But during the recent past it is felt that reporting merely on the financial performance is not enough. Every enterprise has a social impact and such financial statements fail to exhibit the same. As such some additional reporting (in whatever form) is necessary which may analyse the give and take position of the enterprise to and from the society and the environment in which it carries on its operations.

Underlying this social importance of financial statements is the theory of the right to know information to all accentuating the public right to full disclosure in financial reports. Accordingly social disclosure should serve to provide additional information about the firm's overall performance, not just the bright spots and even the derogatory information, if any, about the firm should not be omitted.

The corporate sector occupies an important role in the socio economic structure of the national economy. The various social interests like obtaining better stuff and better services, ensuring better prospects for employees and workers, making gainful contribution to creating employment and training opportunities, contributing towards value added, making the government revenue and export earning more buoyant, tackling environment problems etc are important obligations on the part of the corporate sector towards the society. Social reporting on the aforesaid aspects assumes increasing importance with the growth of the corporate sector.

Some of the reasons on account of which social programmes are adopted by the firms may be to comply legal requirements (e.g. safety work programmes, pollution abatement programmes etc) to avoid costly litigations (e.g. product safety and affirmative action programmes) to improve public image and to mitigate product boycott sabotage and political pressure for



legislations considered harmful to the firm. Some programmes may be for corporate survival and long-run profit interest. Thus the social programmes for the purpose of social accounting are must for the enterprises.

The corporate critics of today have, therefore, gained new premises altogether and have launched their attack on the artificial divorce of economics and politics ethics and other dimensions of life because they consider the corporation – not only the organizer of economic production but also a key producer of environmental impacts. They expect the corporation to behave in the same responsible manner as other members of the society.

#### **Standards of performance in Socio Economic Accounting**

Standards of performance in Socio-economic Accounting will have to be evolved on the same basis as these have been developed by business organisations in respect of the in puts of human resources, capital assets utilities and services in relation to the outputs of products and services and their profitability. It would also be essential to quantity and budget to the periodic outputs of the organisation to fulfill the willingly accepted objectives of the social responsibility of each business unit on the same lines in those followed in respect of the output of products services and profitability with constraints on availability of resources.

i) Some of the products and services are internal to the organisation. Training of personnel and managers of all grades and adequate motions for their self development is one such component of social responsibility. The effective development of the human capital of the organisation and continuous improvement in the working conditions and safety environment exercise a healthy influency on a shapely growth of the organisation. Quality consciousness of the products and service by appropriate inspection and testing are also internal to the organisation. Budgets and accounts pertaining to development of the human capital and quality consciousness as also benefit cost analysis of this aspect of social responsibility would require upgrading of management accounting techniques in this respect. Quite a few research paper have been published recently in professional journals of USA and UK. Their application of quantification of these in current Indian socio-economic environment of purpose of accounting and periodic reporting require further research.

Benefit cost analysis for development of ancillaries involves forecasting out of less sophisticated items of components, parts, spares, look and services to the small scale industries in the neighbourhood. It may involve transfer of technical know how, manufacturing drawings and even testing and quality control devices. This may even require training of personnel, bank guarantee for credit, as well as making available scarce raw materials and services and utilities like power, fuel, gas, etc. While encountering household manufacture, this may involve even higher commitments for provision of materials, quality control systems and other services eventhough these activities may form a part of social responsibility of business, their accounting would follow the normal system of accounting. If the company decides to provide some services like training of personnel and provision of testing and quality control without any charges, these may be treated as a part of social overheads of the company in partial fulfillment of its social responsibility.

In case where the business is running its own educational institutions, free or highly subsidised education facilities may be made available to employees, their children and dependants and to the children and adults residing in the neighbourhood. Similar is the case for health and family planning service. It should be possible to quantify the net expenditure on these services for own employees and their dependends and outsiders. Whereas the social overheads of

the company include all such expenditure both capital and revenue the amounts spent on education and health of the outsiders is certainly capable of quantification and reporting, if significant in each annual report.

Laws pertaining to prevention and control of environmental pollution have been attracting considerable attention of both the government and the public all over the world. The problems pertaining to disposal of chemical wastes of the fertiliser, oil, drug and chemical industries involve additional costs in processing and disposal. The problem of elimination of smoke and dust from thermal power plants has also attracted considerable attention. Capital as well as revenue expenditure on avoidance of environmental pollution should be treated as a part of its normal operating costs of the company. If any specific improvements are made, this may be included in the annual report.

Some companies have adopted selected villages or rural areas for improvement in the quality of life of the rural citizens by investment of their human and financial resources. They have improved the drainage and water supply systems. Some of them have transferred technology by making available better seeds, saplings, fertilisers, pesticides and knowledge for their appropriate transportation, preservation and utilisation to optimisation of yields from crops in agriculture and horticulture. Where these activities do not impinge directly on the sales programmes of the business unit, these have been treated as a part of the marketing expenses and sales overheads. The problem of rural development, rural industrialisation and encouragement to household manufacturing and handicrafts for providing gainful employment to rural citizens are far more immense. Similarly, improvement in the quality of life of the rural citizens requires provision of adequate quantities of wholesome potable water and drainage by conscious efforts. It is felt that these problems of villages and urban slums should also attract the attention of business units as part of their social responsibility.

Growth of administrative overheads become less painful with the appreciation or need of research and development and innovating in respect of products and processes in business and industry. Growth of social overheads gradually become less painful with an in-depth appreciation for need of improvement in human capital, quality consciousness and avoidance of environmental pollution.

Social costs and social benefits built into the capital and operational costs of public sector units are hardly identifiable from the commercial costs and commercial benefits. The main difference lies in a separate reporting of the social overhead by some companies. The social overheads mostly describe the capital and revenue costs of benefits to the employees in the form of residential facilities, water and power supplies and general welfare. These reports do not indicate whether the company has undertaken suitable action for the welfare of the people in and around the area of its location.

Apart from these public sector companies, very large public funds have been invested by central and state government in departmental enterprises. They provide utilities and services from which the public pays for and in most cases these are monopolistic organisations. It appears essential that there should be some form of reporting of social costs and related social benefits by these departmental agencies. Each state has invested large sum in its State Electricity Boards for power generation and transmission. Whereas quite a few comparable private sector companies are able to utilise about 80% of the rated capacities, most public sector units utilise only 40 to 60% of their rated capacities and the voltage fluctuation is erratic. Granted that State Electricity Boards are meant to serve a public purpose and hence social costs, but certainly the people have



a right to question such low capacity utilisation. They have a right to ensure that they get satisfactory services at a reasonable cost. In quite a few cases, the social costs are high, economic costs are still higher and social benefits appear to be of a higher character.

The conceptual framework of sharing the pleasures and pangs of living with the 'have-nots' of the neighbourhood by business and industrial units is bound to change the character and quality of social overheads of such units in the near future. Practical experiences of many enlightened managers, supervisors and operative personnel indicate that one of the most fruitful methods of evolution of concepts of the social responsibility of business pertains to their personal and emotional involvement in specific projects by investment of their own personal time, energy and skills in addition to those invested by the business unit. This applies not merely to the personnel of the small, medium and giant size manufacturing, processing and business enterprises, but also to personnel involved in public services as well as those engaged in providing various types of educational, welfare and health services and family planning. It would also apply to the comparatively better off people and groups engaged in the distribution of products and services as well as agriculture.

Some of these enlightened personnel have constituted their own voluntary agencies, through local, national or international organisations. Yet others have contributed their time, energy, skill and other resources through an organisation of their own units. They have adopted selected villages or rural areas for improvements in agricultural and horticultural practices and water supply, public health, education and drainage systems. It has been generally found that such emotional involvement of personnel for fulfilment of social responsibilities has not led to any deterioration in their contribution to the main objectives of the business unit. On the other hand, this has led to higher devotion by such personnel to their official well as other social activities.

Such emotional and personal involvement of the 'haves' in society for the welfare of comparative 'have-nots' has removed the physical and mental distance between the 'have and the 'have-nots'. Its advantages have been quantitatively significant. An integrated steel plant, a fertiliser unit, a power generation plant or a textile unit may occupy 2 to 10sq.km. area for its plant and a similar area for its own township for providing accommodation to the managers and employees. It has a surrounding area which will generally be inhabited by people who are not as well-off as the employees and managers of these plants. It is also likely that even in the plant and residential areas there may be groups of people like the non-employees who are working with contractors as construction workers or as labourers for providing services to the plant and township. These comparative 'have-nots' have their own problems. The emotional and personal involvement of employees and managers in making efforts to improve the quality of life of these 'have-nots' involves fulfilment of social responsibilities of the business at a comparatively lower cost.

In quite a few cases, the managers, supervisors, and operatives as well as members of their families can spare their time and personal skills for devotion towards service of the comparatively poor people residing in the surrounding villages and rural areas. They are able to establish communication with the people of the surrounding areas, understand their problems and provide personalised services for improvement in the living conditions of these local people of neighbouring villages. In this process they develop a better understanding of national problems: This also enables him to share the pangs and pleasures of living with their neighbours as also an understanding of their language, custom and culture.



Some, of these services in fulfilment of social responsibility can be categorised as economic services; like improvement in the agricultural and horticultural practices as well as water management, flood control and social conservation. Quite often, these types of personalised services could develop better communication between the local administrative agencies for provision of fertilisers, pesticides, better seeds as well as new type of fruits which can be locally grown by improvement in horticultural practices. These economic services can also include supply of free or subsidised milk from various agencies who are willing to donate as also a better flow of credit through banks when required for economic production by the local people. Some groups have also provided media for improvement in household manufacturing and handicrafts and their marketing. The social services that can be provided by such emotionally and personally involved groups in terms of education, trading, adult literacy, family planning and health and hygiene are considerable. Running a small hospital or dispensary, running a small educational institution for women and boys has been attempted by the personnel who are employed in these medium and giant size enterprises in the surrounding area. Quite a few of them have provided real emotional satisfaction to these employees and have provided effective service to the rural citizens.

#### **Measurement and Reporting of Socio-Economic Accounting**

Measurement and reporting of social responsibilities of business should also be categorised into internal and external components. Reports pertaining to quality of the product and services, as well as for development of human capital and ancillary units in terms of costs as well as social benefits are clearly identifiable. In this respect all the budgetary techniques of quantification of costs and benefits as developed in management accounting are fully applicable. The interpretation of data pertaining to effectiveness of costs for optimisation of benefits will follow the normal pattern. The effectiveness of contribution made by the business unit for improvement in the living and working conditions, safety measures as well as medical, public health, canteen, drinking water facilities and related social benefits should be reported as a part of this internal component. Services like provisions for family planning, transport and related amenity measures to employees fall in this category.

Measurement and reporting on the social benefits and beneficiaries in respect of services to non-employees of surrounding areas and neighbourhoods in terms of portable drinking water, educational and medical as well as birth control measures should be capable of measurement and reporting without incurring additional costs. So would be the situation in case of villages or areas adopted by the unit for improvement in agricultural and horticultural production as well as drainage and related social and economic services. The extent to which these investments are related to sales and marketing should be clearly stated.

In respect of personalised services by individuals, groups, institutions and voluntary agencies constituted by the management and employees of the business, measurement and reporting would require special care. They may develop and implement selected projects for service to the comparative 'have-nots'. Having determined the priorities, performance budgets can be prepared on the basis of availability of resources, if necessary, by discussing with the local people so that they also develop an emotional involvement in the development of the projects and their implementation. An essential by-product can be identification of local resources in terms of human skills and physical availability of materials for household manufacturing and handicraft. Marketing of the outputs of goods and services which can be manufactured by the small and tiny sector of industries, household manufacturing and handicraft can open new sources of income to the local neighbourhood. Appropriate measure and suitable

periodic reporting of investment of time, resources and energies and extent of benefits " achieved by the neighbourhood community could provide motivations for upgrading of this personalised service. In this situation the modern temples of industrial could spread light in the neighbourhood and this could serve a well-expected social purpose.

For effective fulfilment of social responsibility of business units as well as their employees, the techniques of quantitative elements in decision-making can be utilised for selection of projects. Standards can be established for optimum effectiveness of resources in performance budgeting. These techniques of benefit- cost-analysis and managerial valuation by utilising quantitative elements of decision-making can prove a great asset in selection of projects and priorities. These would also establish criteria for the measurement of success of these projects as they get off the ground. Increasing social and economic stress are compelling the modern corporation to re-define its functions so as to find a proper identity level. The transformation of stockholders into stake-holders have changed the focus of accounting. This is evident in its efforts of searching for proper measurement and reporting methods.

The Common Area of Reporting should include:

**A) Environment**

- i) Pollution control of industrial process.
- ii) Research on new methods of production to reduce environmental hazards.
- iii) Protection or reclamation of country-side.
- iv) Energy conservation.
- v) Raw material conservation and re-cycling.
- vi) Support for public or private action designed to protect the environment.

**B) Employees**

- i) Training schemes.
- ii) Educational facilities.
- iii) Health and safety standards.
- iv) Pensions.
- v) Holidays.
- vi) Employment of minorities.
- vii) Employment of women.
- viii) Trade union and worker consultation.

**C) Products**

- i) Monitoring user safety.
- ii) Improvements in public interest
- iii) Consumer affairs expenditure.

**D) Community and Other areas**

- i) Donations to charity, the art, sport, etc.
- ii) Support for employee involvement in community activity.
- iii) Relations with local population.
- iv) Participation in government committees and public sector activities.

The cost and management accountants have developed, during the last few decades techniques for optimum utilisation of resources for maximisation of production of enterprises and benefit-cost ratios of service-organisations. They can participate actively in development of projects and programmes for maximisation of benefit-cost ratios in respect of quality control



avoidance of pollution" as well as, socio-economic programmes of rural development- family planning and public health. They can also identify and measure the effectiveness and submit periodic reports as a part of the management information systems for satisfactory fulfilment of the social responsibility, of business units as well as service organisations, public sector units and government departments engaged in quasi-commercial activities.

The cost and management accountants will have two types of role to play. As people trained in a discipline, they should be able to provide the measure of benefit-cost analysis for these socio-economic programmes and advise the management and groups of individuals of employees in selection of the projects, programmes and activities which have comparatively higher benefits for the same costs with limited availability of resources. The second aspect of course relates their personal contribution as employees and managers for improvement of socio-economic environments.

Appropriate techniques for accounting of effectiveness of investments in the development of human capital as a part of social responsibilities of business are being evolved. The application of these techniques to individual business units requires development of tailor made systems to suit the organisation. Cost of quality control and corresponding benefits have also been a subject of special studies by management accountants. By the very nature of their knowledge, training, expertise, experience, practice and skills, it is quite likely that the cost and management accountant of the future will be associated even more closely with the identification of the scope for adequate fulfilment of the social responsibilities of business of large, medium and small sizes. Analytical studies of projects and benefit cost analysis of programmes as also measurement of the extent of success when these projects and programmes get going provide a new set of challenges to the profession of cost and management accountant.

#### **Problems in cost benefit analysis**

Cost benefit analysis suffers from some conceptual and operational problems. Firstly the analysts were faced with the problem of enumeration of costs and benefits. Apart from externalities arising from inter-dependence within the various units of the agency, pecuniary and technological spill overs outside the agency present serious difficulties in enumerating costs and benefits. To what extent indirect benefits should be taken into the calculations remains a difficult question. Assumptions about the project life may also involve arbitrary judgements. Secondly valuation of costs and benefits is a far more formidable problem. It is obvious that market price is a poor indicator for determining costs and benefits. It is not easy to determine the relevant price since the behaviour of supply and demand curves are likely to be non-linear in character. There can be radical changes in the relative prices of factors as well as all commodities and services. But the index is more complicated by the imperfections of the market. The cost side can be further affected by the distortions in international and national market structure arising from monopolistic and oligopolistic tendencies as well as by the linear elements in factor costs.

As for costing, the concept of social opportunity costs are considered to be more relevant especially in developed countries where the problems of spill-over and markets matrix are more acutely felt. For instance, when labour is unemployed, the market wages cannot correctly reflect particular cost of labour to society. Similarly, economies riddled with shortage of capital and foreign exchange will have to add a premium to the cost computation where the use of such scarce resources are involved. In the same way, employment generation, balanced regional development, self-reliance as well as other intangible benefits will have to be assigned weights if such benefits are to be quantified. Valuation of this kind is beset with innumerable problems. Thirdly the choice of the social rate of discount is rather difficult. The perspectives of the



individual and the society as a whole, are found to be different. It is true that only a particular strategy of society is represented at decision-making levels under a given social system. Their values are reflected through ballot box and determines the character of the state. Depending upon the voice of the dominant classes in society and their relative preferences between the present and future, weights are assigned to the present consumption over creation of capacity for future consumption. Some may be concerned more with the costs and benefits affecting the well-being of future generations than that of the present. But, at the same time, risks and uncertainties concerning society as a whole are basically different from those facing the private individuals. Both may, to some extent, suffer from a defective telescopic faculty. Nevertheless, the community as a whole cannot be indifferent between the present and future consumptions. They are likely to have a preference of the present for the near future to the distant future. Thus the social rate of discount implies that the community values benefits and costs falling at different times differently. The degree of preference to consumption today to consumption tomorrow will be reflected in a positive discount rate. However, there can be differences amongst analysts as well as the decision-maker as to what exactly should be the social rate of return.

### **Social Reporting**

There are many terms which are used for social information such as social audit, social accounting, social-economic accounting, social responsibility, accounting and social reporting these terms have been used interchangeably as they appear to be synonymous. Although the question of terminology does not have much significance, its use should characterize appropriate and generally accepted conceptual frame. work. The term "Social Audit" had been much in use. It is not at all audit, but a form of social report. The term "Social Accounting" has secured recognition as a customary usage in national social analysis and planning. The term social reporting, is more appropriate than others. Social reporting is a rational assessment of and reporting on some meaningful definable domain of the activities of a business enterprise that have social impact. this reporting aims at measuring (either in monetary or non - monetary units) adverse and beneficial effects. of such activities both on the firms and / or those affected by the firm. Being concerned with the social, human and environmental constraints on organisational. behaviour, it measures social costs and benefits. the social reporting information is communicated to social groups both within and outside the firm. thus social reporting implies the measurement of reporting - internal or external- of information concerning the impact of a business enterprise and its activities on society.

### **Issues in Social Reporting**

The following questions appear to be quite significant while making corporate social disclosure.

- i) For whom should the information be disclosed?
- ii) What is the purpose of information

The identification of users is of a great significance because it would solve other issues in corporate social reporting. A major advantage of social reporting for management will be to improve information pertinent to making decisions in compliance with both social pressures and legal requirements. Similarly, social reporting can provide useful and relevant information to external users such as investors, employees, customers and society at large for making economic decision.

- iii) What should be the purpose of social reporting?

To report on stewardship of the resources entrusted to a firm by society or to provide useful information i.e. information to be used in evaluating enterprises or for allocating scarce resources among firms. Often there may not be a conflict between these two objectives. But when objectives are different, different reporting treatments are needed. To resolve the conflict, a dominant or primary objective is to be agreed upon.

Corporate social reports should be useful. But not enough literature is available to suggest decision models, composition of various-users or user groups, informational requirement of users. These constraints create a bottleneck in the process of accepting what is useful as a dominant objective at a given time. Therefore, stewardship reporting can be proposed as the primary objective at least during the present developmental stage of social reporting. Cooper and Ijiri have emphasized on accountability in social reporting, consistent with the objective of stewardship reporting. As social reporting progresses and gets standardised, the objective of usefulness may become dominant. But for the present, the stewardship reporting can be made the primary objective in guiding social reporting.

iv) What information should be disclosed, when and how?

Probably the most important questions are the quantum and type of social disclosure and the method of disclosing them. However, once the target users and their specific purposes are delineated satisfactorily, the extent of social disclosures can be worked out easily. Since the objective of social reporting is proposed to be stewardship reporting, there should be full and fair disclosure of the priorities selected as well as consequent plans and the lost opportunities, for example, as measured from the maximum possible attainment planned for each possible goal. This should be subsequently followed by comparison of planned versus actual accomplishments in each pertinent dimension. This will not only ensure improved accountability in all the pertinent dimensions but, also be valuable to investors and others who might be interested in investment opportunities associated with planned and past management behaviour.

#### **Social Reporting Attempts**

It will not be inappropriate to mention a few attempts made to measure and report social performances in corporate annual reports. For instance, Elias and Epstein found that following items were disclosed in US Annual Reports - environmental quality, equal employment opportunities, product safety, educational and charitable donations, industrial safety, employee benefits, various community programmes, and responsibility to personnel. According to Report of the Committee on Accounting for Corporate Social Performance (USA) the number of US companies making social responsibility disclosure has increased. Trotman's study revealed that Australian companies were disclosing social responsibility information in the areas of environment, energy, human resources, products, community involvement etc.

#### **Social Reporting Model**

The main problem in a corporate social report is to breakdown all or a large part of the social performance activities into definable components and to develop scales that measure these components. The Sachar Committee Report Comments :

As far as possible social report must be cast both in quantity and monetary terms. Though there may be some differences amongst the various bodies and institutes as to the exact manner in which the quantification and verification is to be done by the companies, there is no dispute about certain well-accepted areas and items, which directors must disclose as an additional information every year.



No format of social reporting has emerged finally. The companies have been following different methods of social disclosure. Some of the approaches are described below.

i) To quantify values contributive to society (or, assets) and detrimental to society for actions taken or not taken (liabilities) and array them in a manner comparable to the typical financial statement - the balance sheet. This is basically an accounting (cost - benefit analysis) approach and involves difficult and costly calculators.

ii) In a programme management approach only those activities in, which a particular company is involved largely for social reasons are measured. The social impact of corporate activities is considered as beyond qualification. The corporate managements generally develop an internal information system that helps them evaluate better and administer socially-oriented programmes: This does not have a great potential for external reporting. However, being ratio and based on cost-benefit analysis. It can be used by corporate managements in its overall planning and budgetary process. Therefore, it is valuable to management and has some utility to the users:- The approach followed by TISCO in its social audit is oriented towards theoretical expositions and is similar to programme management approach. The programme management approach has some weaknesses. It is of little value in the selection of priorities, because it tends to evaluate individual social programmes in vacuum. The process does not include an estimate of the needs and demands of the communities. This approach will not be useful for external reporting purpose. It concentrates attention about a small segment of corporate activities, namely, non-traditional items containing some element of expense which are classified as socially oriented.

iii) Corporate social reporting may be done by groups and individuals outside the business enterprise in terms of the extent to which companies are responding to social and environmental demands made on them. This is basically not an accounting approach. The social audit performed by TISCO is done by a committee consisting of persons outside the entity.

#### **Social Responsibility Audit**

In imparting management orientation on the management of behaviour and responsibility, a few difficulties exist. Since specific definitions for social responsibilities and constituencies are materially non-existent, a proper audit cannot take place. It has therefore, been found more convenient to adopt a practical approach 'based' on the following.

1. Dividing "social responsibility" into identifiable components.
2. Assigning relative weights and priorities to various elements.
3. Entrusting responsibility for overseeing performance.
4. Setting up a variety of goals and operating methods to comply with the new criteria thus put up.

All these suggestions have been further construed into a model which constructs a utility function comprising preferences of various constituent groups with respect to multifarious social results. This is again based on an application of multi-dimensional scaling techniques to paired compositions in the development of a "compensatory decision model". Very little has been done in regard to accounting for social assets, liabilities and efforts. In an attempt to break a new ground and cover up deficiencies in this regard, some tentative goals have been suggested by the Committee on Social Management of the American Institute of Certified Public Accountants which are as follows :

1. Helping business to make plans and formulate decisions to take external social impacies into accounts.
2. Helping business to make its own probono public expenditure more productive.



3. Reporting to business's various constituents, including government and regulatory agencies, on its performance as a corporate citizen.
4. Enabling investors, if and when they desire, in taking social responsibility into account in selecting their financial portfolios.

As a corporate level it would be advisable to institute a system of social responsibility audit. A beginning could probably be made by making such audit a statutory requirement for public sector undertakings. The purpose of this audit can be summarised as follows.

1. To examine systematically on an organisation - wide basis the existing policies and practices relating to social responsibilities internal and external to the organisation and to analyse strengths and weaknesses, threats and opportunities in these policies and practices.
2. To prepare short and long-term improvement plans concentrated on a limited number of identified priorities. This improvement plan for social responsibility should be balanced with other objectives and integrated into the overall organisation's planning and control system so that the plan gets implemented.
3. To review progress and to reset priorities every year.

The areas identified for the social responsibility audit are given below:

**i) External Environment**

- a) Social responsibilities and new opportunities.
- b) Community relations.
- c) Consumer relations.
- d) Pollution.
- e) Packaging.

**ii) Internal Environment**

1. Physical environment.
2. Working conditions.
3. Minority groups.
4. Organisation structure and management style.
5. Communications.
6. Industrial relations.
7. Education and training.

There is no single definition of the concept of social responsibility audit. There is no precise and mechanistic way to do this audit. It is also very difficult to find reliable quantitative performance standards for this audit. The American Institute of Certified Public Accountants has appointed a committee to help develop standards and techniques for measuring, recording, reporting and auditing social performance.

Social American companies already set the pace for social responsibility audit. At General Motors there is a Public Policy Committee, a permanent standing committee of the Board of Directors. They enquire freely into every aspect of the Corporation's business activities that relates to public policy and make recommendations. The Committee meets every month. Reports are invited from management and outsiders, including others who may contribute views contrary to the Corporation's.

The public concern plays a greater role in Gulf Oil's strategic business planning and a Public Affairs representative sits in the highest council where corporate policy is set. Gulf's new

public affairs organisation consolidates the activities previously performed by several departments -public relations, government relations, shareholder relations, international affairs, consumer affairs and advertising - and aids the vitally needed public affairs planning effort.

In the Indian context, there could be a committee appointed with representatives from the Institute of Chartered Accountants, All India Management Association and Bureau of Public Enterprises to develop a set of social indicators for each industry or a group of industries. The performance of the companies vis-a-vis the target of social indicators should form a part of published balance sheets. This should be made applicable to both public and private sectors. Managements should be judged not only on what profits they generate but also on what they do for the society as reflected by the social indicator. A beginning may be made by establishing departments of public affairs in each major undertaking on the lines of Gulf Oil and public sector undertakings should take a lead in this gesture.

#### **Making social responsibility effective**

Following the establishment of criteria for measuring social responsibility, it is easier to evaluate the following seven mechanisms-which have been suggested as ways to bring business and society together.

i) Trust the Market: The best mechanism for linking companies to the rest of society already exists in the form of the market. At a purely national level, employee-, consumers, the public and the media must draw attention to irresponsible behaviour by companies and that organisations which do not measure up to what society expects to them must be allowed to survive.

ii) Information: If more attention is paid to the provision of facts and figures, the market could function properly. More information should flow from firms to the members of the wider society, who would thus be able to evaluate the firms' good deeds and their imperfections. This may be termed the 'market research' point of view. It includes proposals that more information should also go from the community to firms through surveys, user's groups, residents' associations, shareholders' meetings and so on.

iii) From a number of different points of view, the suggestion is made that a small group of people can be given the job of ensuring the co-incidence of the interests of business organisations and society and among other things, selecting relevant information. This seems an economical idea, especially when the problem is as big as how to link a multi-national to Indian society. Some managers can be relied upon to act as trustees for society, skilfully balancing the many implications of alternative courses of action and choosing the best one. All that is needed is the establishment of management as a profession with its own code of ethics and governing body. At international level, there are the guidelines to International Investment of the International Chamber of Commerce. Other suggestions are that accountants, consultants, or social auditors can do the job. Such an attitude has also led to the United Nations appointing the group of eminent persons to look into the multi-nationals' relationships with nation states.

Criticism of this approach is based on the fact that it would be impossible to turn management into a profession with restriction of admission and occasional expulsion like other professions on the principle that managers should not be subject to prosecution, judge and jury in a case of society versus a company; and on the lingering subjectivity of the values of other possible delegates, even of university-educated social auditors. The UN group is likewise imperfect as the sole body to decide on the role of multi-nationals.



iv) Calculation: Many hopes have been placed in the supposedly impersonal processes of cost-benefit analysis, whether it be of the purely economic or the broadly social kind. These devices suffer, however, from the weakness that they are man-made; although internally they are very logical. Most important, the economists who administer such techniques do not agree among themselves, on their applicability to the activities of multi-nationals, nor has a solution been found to the problem of the proper relative weightings to be given to social and economic factors.

v) Representation: It is necessary to examine the internal structure of the companies. Uncommitted outsiders should sit on company Boards as guardians of the community's interest or that employees originating from many different regions or countries should hold the top jobs. Another suggestion is that decision-making be decentralised down to the small units that go to make up the larger company, whether national or international. Such decentralisation will, it is held, make the company both more sensitive to local needs and more successful owing to increased enthusiasm, which will be the response of local employees to the trust placed in them by top management. This approach, while interesting, has been less tried than the others, as yet. It is, however, a limited approach because it assumes an ultimate harmony of interests between the firm's top management and the community representatives or subsidiary management. The idea is to bring the people into the important decisions or to send the important decision out to the people. Perhaps the firm may be seen as too big and it may be requested that it be split up into small firms. After all, it has already been argued that large or multi-national firms are not really necessary. But the "representation" approach excludes the possibility of such a change. If it fails to meet the only two criteria that matter in this example—that the original company has no shareholding in a new one formed from what was formerly its Indian subsidiary and that the two really disagree on what is good for India.

vi) Nationalisation : This is the extension of representation and includes all the community, not just some members of it. This method amounts to formal delegation of the policy-making task by society to government officials and requires their direct intervention in the day-to-day running of companies as compared to the indirect relationship of legislation. The method includes the creation of government corporation take-over of multi-national off-shoots, joint government-private ventures and the award of short term contracts for specific tasks.

Such a mechanism is useful as a threat, not an accomplished fact. It is attractive because of the expectation that scrutiny by Parliament of the affairs of one or two major profit-making enterprises will ensure self-discipline in others. If this does not work, extended nationalisations brings with it serious difficulties of policing. Particularly in the case of the larger firms, nationalisation means no more than substituting one set of faceless masters, for another. If there have to be many sets of such masters, although they report ultimately to committees of Parliament, the already over-worked committees will be unable to cope and effective control will be no more than before nationalisation. This solution in fact offers no better an answer to the problem of ensuring responsible activities on the part of society's delegates, than does the method of trusting managers and other informal delegates who may set themselves up as the people's trustees, which was described earlier.

Nationalisation is full of problem when it is intended for multi-national companies. Doing it to one company, far from frightening the others into responsibility, may encourage them to run away altogether. Or they may stay, but the state directors may find themselves presiding over empty shells, cut off from most of the crucial 'know-how' and from the service departments of the international group. If it is desired to acquire a proportion of the local operations of several



multinationals, there is the additional problem of how to raise the money. If India wanted to take over some or all of the Indian subsidiary of multi-nationals, and for that takeover, to mean something, it would be necessary for the Indian government to negotiate with the respective governments over whose law should count in establishing the company's rights. Effective control of multi-nationals, therefore, requires a legal framework agreed between countries or between regions such as the EEC.

vii) Legislation : Each of the above suggestions has its strengths and should be made use of; but each has its weaknesses, and will always create as many problems as it solves. Additionally, all of the above mechanisms require the express approval of Parliament, or its continued toleration, to gain any social respectability at all. Whatever is the highest law-making body in the land, its laws should certainly be obeyed by companies, to the letter; but this is a sound, unhelpful thing to any obeying the law, like giving out company information or worker participation, is a necessary but not a sufficient condition of social responsibility.

It cases where only some of the citizens of a country are allowed the vote, or where there is a permanent imbalance in the influence of voters on the making of laws, a law-abiding company must not deceive itself that it is conforming to the wishes of society, rather than to those of an elite; and it makes no difference whether the elite is reactionary or reformist. If the short terms imbalance is inevitable, there will never be any such thing as the perfect political system. But flexibility is essential to the health of the system. What matters is not only what is in the laws, but how they were made.

It is in the interests of multinational companies as well as any other members of Indian society to encourage the simultaneous arrival of three things within the countries where they operate. Firstly, a minimum standard of survival for all the population, directly guaranteed rather than indirectly hoped for as the result of employment. Secondly, the widest possible participation, by all individuals in political discussion. Thirdly, the help of government officials for companies wishing to satisfy the theoretical requirements for responsibility; that is, given that there are various laws (concerning for example, nonopolies, advertising, noise, safety, etc.) there must be evidence of effective policing of these laws, followed, up by sanctions which really penalise law-breakers. No company operating in an administrative vacuum can realistically make any claim to social responsibility.

It has sometimes been argued that the developed world and the third world are two separate communities; but this idea would only stand up, if there were no contact at all between the two sides. Infact, many peoples in the third world are both suppliers and customers of the developed nations. a smaller number also work in multi-national's subsidiaries. They must be included in the audience to which the rich countries of the world are responsible.

To mention social responsibility in this case implies that the multi-national can act to lessen or to increase the inequality of influence between rich and poor. Many companies have claimed proudly that there is a vision that is not confined to one nation or groups of nations. The phrase 'One world' is often used. For this to mean anything, the companies have to ensure that their actions are not benefiting one country at the expense of another. One world excludes the idea of exploiters and exploited, whatever might fill those roles at any particular time.

The pre-requisite for international social responsibility is the ensuring of universal freedom from certain basic cruelties. The United Nations body should assemble representatives of the poor and work out minimum requirements, How their provision would affect the developed nations is not clear. It may be that in order for all the citizens of the world to achieve

the minimum level of existence, other nations' citizens at the existing living above that level, should be prevented from further increasing their living standards. This may or may not be necessary and certainly does not mean the same as saying that the latter group should cut their standards, which is a different argument. What international social responsibility does demand, however, is that a very short time limit be set for the attainment of the minimum.

The organisation of human survival is the best task for the multi-national companies. Their chief target should be their efficiency in investment, persuasion, and distribution. The same feeling about the task of the young managers in training should be to obtain the necessary redistribution of resources before further growth. The alternative is that companies should be taxed by the UN as they are already taxed within the countries where they operate. Taxation would be on a firm's total turnover of profit, and the proceeds would provide the basic necessities for those people who needed them.

Once the minimum has been attained, and provided the World Health Organisation has the means to maintain the world community at no less than the minimum level, there can be no other permanent rule governing what countries / and companies should do to each other. But this does not imply *laissez-faire* with the world: to take a long-term view would also involve maintaining certain minimum standards of (human) treatment of plant, animal and marine life, since it is clear that the survival of the human race depends on the preservation of other forms of life. This means that there would be some additional limitations to total freedom of human activities. Once again, however, the emphasis should be on ensuring that those who decide in limitations represent all the nations, and that their votes are equal. After that, continuing political activity is the any guarantee of a just world.

The only world organisations in addition to the WHO, whose existence can be justified in principle, are a strong FAO and a strong UN peace keeping force. The point is that to set up, for example, a set of international laws establishing the sovereign rights of countries and multi-nationals, or to get, GATT to administer an international code, relating to monopoly, size, transfer pricing, etc., is a less urgent priority than the provision of a minimum standard of survival; and this can only be done 'properly', when the world electorate is given a chance to vote.

Multi-nationals exist and so do many other international bodies. The companies' only way to become socially responsible is to act as midwives to the birth of a genuine political discussion between the nations. If the companies act in ways which seem totally contrary to their own interests, they may possibly not justify their continued operation in a plural world society.

#### Exercises

1. Explain the concept and the rationale of social accounting clearly.
2. Discuss the various standards of performance of socio-economic accounting.
3. Explain the techniques of measuring and reporting social accounting.
4. What are the various problems underlying cost-benefit analysis.
5. What do you mean by "social reporting audit"? How is it attempted?
6. What steps would you take in order to make social responsibilities effective?



## Lesson 11

### Reporting to Management

#### Synopsis

Introduction - Objects - Types - Characters of a good report - Uses:

#### Introduction

No planning and control procedure is complete without accurate feed back of operating results. The system of reporting is considered as part of accounting methods. This system like management accounting has developed most in the U.S.A.

#### Objects

1. To communicate the objects and operating results.
2. To secure understanding and acceptance of the people engaged in various aspects of work.
3. To make suitable changes in the future policies.
4. To review the past performances.
5. To be a sensitive instrument in the hands of the management keeping continuous records of operations ..

#### Types of Reports

Reports can be classified by their forms, contents and frequency as follows :

#### Reports

Forms	Contents	Frequency	
Descriptive	Graphical Tabular	Routine	Special
	Production    Sales    Cost    Finance		

#### I.1) Descriptive report

It is a detailed written report using simple language. It may include tables and graphs. It is given a suitable heading and suitably paragraphed.

#### 2) Tabular reports

It is presented in the form of comparative statements. This is generally used for communicating cost, sales finance and efficiency of workers to top level management.

#### 3) Graphic reports

Pictures and graphs generally attract the eyes of viewers. The trend movement, can be very well presented in graphs. Along with that production cost, variances, fluctuations, components of cost of production etc. can be presented.

#### II Contents

On the basis of contents the reports can be classified into 4 groups ie. Production, Sales, Cost and Finance. Some of the importance periodical reports generally prepared are shown below :

#### 1) Reports to production division

- Actual output details as against estimated, Idle mand hours.
- Budgeted capacity and actual capacity used
- Analysis of cost variance.

Analysis of power consumption and maintenance.  
Analysis of normal and abnormal loss.  
Analysis of labour turnover and absenteeism.  
Ratio of Direct and indirect labour.

#### **2) Reports to Sales Division**

Analysis of actual sales and budgeted sales.  
Analysis of sales variance. -  
Sales analysis - area wise, product-wise  
Analysis of market trend. Competitor position  
Analysis of actual selling expenses as against budgeted  
Selling expenses  
Analysis of sales promotion measures  
Calculation of debtors - Turnover ratio.  
Analysis of customers complaints.

#### **3) Reports to finance division**

Analysis of working capital  
Analysis of capital expenditures  
Analysis of outstanding dues.  
Cash flow and fund flow statement income statement and Balance Sheet.

#### **4) Reports on cost**

Inventory/ cost reports.  
Labour turnover and its cost  
Labour efficiency and productivity.  
Analysis of ordering cost and carrying cost.  
Comparing actual overheads with budgeted OHs.  
Comparing actual cost with standard cost.

### **III Frequency of Reporting**

#### **1) Routine reports**

These are sent at periodic intervals. Production reports should be rendered at shorter intervals.

#### **2) Special reports**

Special reports are to be sent only after conducting special Investigations. Special reports may be sent in the following cases.

Make or buy decision.  
Changes in selling price.  
Cost reduction schemes  
Change or contract decision  
Fixation of salary  
Research and development expenditure decisions.  
Effect of changes in Government policy

#### **Characteristics of good report**

A good report should possess certain basic characters. They are explained below:



**1) Promptness**

The report should be prepared and sent promptly to the concerned. As executives need data quickly to make suitable decisions, the reports should be sent in time.

**2) Comparison**

The report should enable some comparisons to be effected. Comparisons may be Time Comparisons, trend percentages, high-lights, Comparison with past however imply that past performance is being taken as standards for judging the present.

**3) Consistent**

Comparison is possible only when there is consistency in reports. Whenever we provide the same data to different persons in different ways, we should see that the original matter does not get altered and there must be consistency.

**4) Simple**

The report must be simple enough to understand by all levels of management. The report must be clear in its contents. Use proper definitions and exact technical terms and careful summarizations of actual performances.

**5) Correctness**

Correctness does not mean absolute accuracy. However the report must be correct within the margin of error allowed.

**6) Consideration of cost**

The system of reporting should not be a burden for the company in terms of cost, that it should be economical.

**Uses of Report**

1. The management can understand the pulse of the company.
2. The management gets continuous current informations and thereby future can be fore-casted.
3. The management can arrive at scientific decisions with regard to capital expenditures using reports received.
4. Reports also provide useful basis for deciding operating policy, volume of sales, production, sales price, qualities, design, production methods and stock policy etc.
5. Current reports furnish the answer to the following questions:
  - What happened and where?
  - Who was responsible?
  - Why did such things develop.

**Chapter 12****Management of Working Capital**

Working Management is concerned with the problems that arise in attempting to manage the current assets. The current liabilities and the inter-relationships that exist between them. The main objective of Working Capital Management is therefore, to manage the firm's current assets and current liabilities in such a way that a satisfactory level of working capital is maintain a satisfactory level of working capital, it is likely to become insolvent and may even be forced into bankruptcy. Hence each of the current assets must be managed efficiently in order to maintain liquidity of the firm while not keeping too high a level of anyone of them. This lesson would explain the basic ingredients of Working Capital Management.

### **Concept of Working Capital**

There are two concepts of Working Capital- gross and net. The gross working capital, refers to the firm's investments in total current assets. And the term 'net working capital' refers to the difference between current assets and current liabilities. Alternatively, the net working capital may be defined as that portion of a firm's current assets which is financed with long-term funds.

The net working capital, being, the difference between current assets and current liabilities is a qualitative concept. It indicates a) the liquidity position of the firm and b) suggests the extent to which working capital needs may be financed by permanent sources of funds. It also covers the question of judicious mix of long-term and short-term funds for financing current assets. Efficient working capital management requires that firms should operate with some amount of net working capital. However, the exact amount of working capital required varies from business to business depending upon, among other things, the nature of business or industry.

### **The need for working capital**

In its endeavour to attain the business objective any firm should earn sufficient return from its operations. For the purpose a successful sales activity is required. The firm has to invest enough funds in current assets for the success of sales activity. Current assets are needed because sales do not convert into cash instantaneously. There is always an operating cycle involved in the conversion of sales into cash.

### **Operating cycle**

The duration of time required to complete the following sequence of events, in case of a manufacturing firm, is called the operating cycle.

1. Conversion of cash into raw materials.
2. Conversion of raw materials into work in process.
3. Conversion of work in process into finished goods.
4. Conversion of finished goods into debtors and bills receivables through sale.
5. Conversion of debtors and bills receivables into cash. The cycle will repeat again and again.

A firm needs working capital (gross) because the production, sales and cash flows (payments and realisation) do not instantaneous. The firm needs cash to purchase the materials and pay expenses as there may not be perfect matching between cash inflows. Cash may also be not to meet the future exigencies. The stocks of raw materials are kept in order to ensure smooth production and to protect against the risk of non-availability of raw materials. Similarly, stocks of finished goods have to be able to meet the demands of the customers on continuous basis and sudden demands from customers. Goods are sold on credit for competitive reasons. Thus an adequate amount to funds has to be invested in current assets for a smooth and uninterrupted production and sales process. Because of the circulating nature of current assets, working capital is sometimes called circulating capital.

### **Permanent and Temporary Working Capital**

The operating cycle is a continuous process and, therefore, the need for current assets is felt constantly. But the magnitude of current assets needed is not always the same it increases and decreases overtime. However, there is always a minimum level of current assets which is continuously required by the firm to carry on its business operations. This minimum level of current assets is referred to as permanent or fixed working capital. It is permanent in the same way is the firm's fixed assets are.



Depending upon the changes in production and sales, the need for working capital will fluctuate over and above the permanent working capital. Any amount over and above the permanent level of working capital is called as fluctuating, or variable or temporary working capital. This portion of the required working capital is needed to meet fluctuations in demand consequent upon changes in production and sales as a result of seasonal change.

#### **Excess or Inadequate Working Capital**

Both excessive as well as inadequate working capital positions are dangerous from the firm's point of view.

#### **The dangers of excessive working capital are as follows:**

1. It results in unnecessary accumulation of inventories. Thus, the chances of inventory mishandling, waste, theft and losses increase.
2. It is an indication of defective credit policy and slack collection period. Consequently, higher incidence of bad debts results, which adversely affects profits.
3. Excessive working capital makes management complacent which degenerates into managerial inefficiency.
4. Tendencies of accumulating inventories to make speculative profits grow. This may tend to make dividend policy liberal and difficult to cope within future when the firm is unable to take speculative profits ..

#### **Inadequate working capital is also bad and has the following dangers.**

1. It stagnates growth. It becomes difficult for the firm to under take profitable projects for non availability of the working capital funds.
2. It becomes difficult to implement operating plans and achieve the firm's profit target .
3. Operating inefficiencies xxx in when it becomes difficult even to meet day to day commitments.
4. Fixed assets are not efficiency utilised for the lack of working capital funds. Thus the rate of return on investment slumps.
5. Paucity of working capital funds renders the firm unable to avail attractive credit opportunities etc ...
6. The firm loses its reputative when it is not in position to honour its short-term obligations. ,As a result, the firm faces right credit terms.

#### **Determinants of Working Capital**

Number of factors exert their influences on the lever and composition of working capital in an enterprise at different points of time. The following factors may be mentioned as significant among them.

##### **Nature of Business**

The nature of business has an important bearing on its working capital needs. For example a manufacturing concern will have more number of items in the list of current assets and current liabilities than a merchandising or a public utility undertaking and its requirements will therefore be large comparatively. Among manufacturing industries, seasonal industry's

##### **The Manufacturing Cycle**

Obviously, the longer the period of manufacture the larger the working capital required. Most products have alternative processes of manufacture and, if working capital is considered a critical area, the choice has to fall on those processes that have shorter manufacturing cycle. This is a technological choice with an eye on working capital economy.

Credit plays a considerable role in influencing the working capital needs of a concern. A concern, making purchases on credit and sales on cash will always require lower amount of working capital. On the contrary, a concern compelled to sell on credit and at the same time having no credit facilities may find itself in a tight corner. Prevailing trade practices and changing economic condition do generally exert greater influence on the credit policy of a concern.

#### **Growth and Expansion Programmes**

It is logical to expect that large amount of working capital will be required as a company grows. But is difficult to establish a link between the growth in the volume of a company's business and the growth of its working capital. An important point to note is that the need for increased working capital funds does not follow the growth in business activity but precedes it. Advance planning of working capital is thus a continuing necessity for a growing concern. The composition of working capital in a growing company also shifts with economic circumstances and corporate practices. Other things being equal, growth industries required more working capital those that are static.

#### **Profit Levels**

The enterprise with the high gross margins has the chance to restore to the working capital pool at the completion of the cash cycle a greater amount than would be the case if the gross margins were less in the first place. Profit levels in a case influence much directly on the working capital requirements. High profits can be regarded as the ultimate pointed to funds generations from within the enterprise.

#### **Taxation**

Taxation once assessed is a short-term liability payable in cash advance tax may have to be remitted in instalments, the computation being based on projected profits for the period. It is the first appropriation to be considered out of earned profits and the amount of tax is calculated as per tax regulations. It is natural that high taxation will put additional strains on working capital because it is an outflow of cash which brings no reproductive effects.

#### **Reserve Policy**

A prudent financial policy should strongly recommend for the fabrication of adequate reserves out of profit. Dividend policy should be formulated with this objects well in view. Reserves in the form of retained earning have provide a prolific base on which a concern's growth and expansion has been sustained. Reserve policy always gives priority to working capital or funds position of the concern.

#### **Depreciation Policy**

Depreciation policy is simply considered as a part of financial policy which determines the amount to be provided as depreciation charge to make up the ultimate resources for replacement of worn out assets. Depreciation is only a book entry and will have on bearing on the working capital position at the time it is provided. However it has the effect to hold back distribution of dividends which may otherwise be made more liberally and help conserve cash. But at the time the active replacements fail short of depreciation provision the working capital position becomes strengthened, On the other hand excess current capital expenditure (replacements) causes much drain on the working capital pool. Only a well formulated depreciation policy can provide a sound working capital position to the business.

#### **Price Level Changes**

Rapidly rising prices create number of problems on the working capital front. For the same level of business activity comparatively more amount of working capital is needed, It



depends to a large extent, how close to the price changes the pricing policy of the enterprise can run. It is true that not all prices move in pace, while some companies feel relieved of their working capital fully during price changes others find them unmanageable.

#### **Operating Efficiency**

Operating efficiency has a significant bearing on the working capital position. Elimination of wastes and inefficiency are essential to improve the operating efficiency. The level of operating efficiency in these matters will influence the amount of working capital required. Efficiency of operations accelerates the pace of cash cycle and improves the working capital turnover. Working capital position is eased by improving the profitability and aiding with more internally generated funds.

#### **Government Regulations**

Government through Reserve Bank of India exerts much controls on credit, bank rate supply of money etc. For example a) Study group, called Tandon committee constituted by the Reserve Bank of India has established norms for inventory level and accounting receivables in 15 selected industries.

#### **Management of Current Assets Cash Management:**

Approximately 15% of the average industrial firm's assets are held in the form of cash which is defined as the total of Bank demand deposits and currency. Cash is the most important and at the same time the least productive asset that a business possesses. It is highly liquid and essential to meet all current obligations since failure to meet such obligations denotes technical insolvency. Comparing with other current assets cash is the most unproductive or not directly productive, for example Inventories are essential to carry on production and fill customers' orders. Accounts receivables encourage customers place more orders and there by earn more profits. Hence the goals of cash management are a) to decide about the necessary minimum cash balance b) to synchronise cash outflows and inflows in such a way as to reduce both the average and minimum necessary cash balances and c) to put the excess cash balances work in a productive way. The main factor that influences the cash management is the trade off between liquidity and profitability.

#### **Motives for Holding Cash**

Transactions, precautionary and speculative motives are the three traditional motives for holding cash of all firms, regardless of size, type of location. One more motive that may be added to the list is compensation to Banks for providing loans and advances. However a prudent financial manager will never hold cash for speculative purposes and will rely mostly on reserve borrowing power and marketable securities portfolios. Normally Banks do not insist compensating balances when the transactions of their clients are continuous and satisfactory. Hence mostly the first two only will be considered for planning the Cash holdings of any business. Planning and optional cash balance at a particular point of time involves an estimate of cash flows from operations.

#### **Advantage of Adequate Cash**

A firm having sufficient cash, can take trade discounts: Adequate cash also improves the liquidity position of the business. Ample cash is always useful for taking advantage of favourable business opportunities that may come along from time to time. To meet emergencies such as strikes fires or marketing campaigns of competitors, adequate cash resources are necessary.

## **Method of Improve Cash flow patterns**

### **Synchronisation of Cash Flows**

Cash inflows should be estimated carefully at periodic convenient intervals. Similarly outflows should be scheduled to synchronise with cash inflows.

### **Reduction of Cash in Transit**

All efforts should be taken to minimise the delay in the realisation of customers, cheques, 'Lock Box' system can help realise the cheques of customers in far off places. Lock box is postal box which can be established in the customers, places with necessary instructions to customers to send their payments to this postal box. Then the firm's banker at the customers place are instructed to pick up the cheques for local clearance and remit cash expeditiously to main bank account.

### **Utilisation of Liquid Resources**

When a firm is under seasonable of cyclical fluctuations or expands sales or other current assets more cash is spent. More liquid resources may be required to meet contingencies or to stay in a highly competitive market or to meet development expenditures. These factors may cause for the investment of funds for a few weeks, a few months, a few year or more. The financial manager is to decide upon a suitable maturity pattern for his cash holding, considering the time required for holding such funds and the trade off between liquidity and profitability.

### **Cash Forecasting**

#### **Cash Budget**

Generally, cash flows do not much evenly in timing. Sometimes inflows exceed outflows due to large collections from debtors or seasonal sales and some other times the reverse will be the case due to large collections from debtors or seasonal sales and some other times the reverse will be the case due to dividend payments' tax payments or seasonal built up of inventories etc. A cash budget prepared with short-time interval such as weekly, monthly or quarterly basis, shall enable a firm to even out its cash flows. The most important tool in cash management is the cash budget a statement showing the firm's projected cash inflows and outflows over some specified period of time. It is a short-term cash planning predicting all inflows and outflows of cash and expected excesses or shortages of cash at certain points of time. It is considered to be an effective tool of cash management since it aids to maintain liquidity by highlighting the firm's cash position. A firm can obviously know the cash deficit sometimes well in advance and is able to make up the deficit. In case there is surplus cash, the firm has enough time at its disposal to employ on profitable investments without impairing the liquidity position.

#### **Investing Excess Idle Cash**

Since the cash is an unproductive asset it should be minimised as far as possible without jeopardising the liquidity position of the business. The best way would be to invest excess of the required minimum cash balance in marketable securities or to reduce outstanding debt. The point to be considered here is to see that the interest earned over the expected holding period must, more than compensate for transaction and inconvenience costs. For the transfer between cash and marketable securities, to be performed efficiently the cash projections should be made more accurate.

### **Measurement of Efficiency of Cash Management**

#### **Ratio of Cash in Current Assets**

The liquid ratio or the ratio of liquid assets to current liabilities indicates the firm's ability to meet its current obligations without revealing anything about the efficient usage of