

Cost & Management Accounting



Institute of Open and Distance Education

Faculty of Management

Cost & Management Accounting



3BBA4



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3BBA4

**COST AND MANAGEMENT
ACCOUNTING**

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Basics of Cost Accounting and Theory of Production Cost

Basics of Cost
Accounting and Theory
of Production Cost

NOTES

The Unit Include:

- Introduction
- Evolution of CA
- Cost Accounting
- Importance of CA to Business Concerns
- Advantages of CA
- Limitations of CA
- Objectives of Cost Accounting
- Distinction Between Cost and Financial Accounting
- Short Run Cost-output Relation
- Cost-output Relationship in the Long-run
- Economies of Scale
- Diseconomies of Scale
- Cost Function and Cost Curve
- Long Run Average Cost Curve
- Summary
- Evaluate Yourself
- Case

Learning Objectives:

After going through this chapter, you should be able to:

- Understanding various cost concepts
- Analyzing cost output relationship
- Examining hidden intricacies

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INTRODUCTION

The term cost means the amount of expenses incurred on or attributable to a specified thing or activity. According to the Institute of Cost and Work Accounts (ICWA) India, cost is the 'measurement in monetary terms of the amount of resources used for the purpose of production of goods or rendering services'.

With reference to production/manufacture of goods and services cost refers to the sum total of the value of resources used like raw material, labor and expenses incurred in producing or manufacturing a given quantity.

Note: The word cost cannot be understood independently and has to be understood in relation to a particular product, thing or service.

Initially, business houses considered factory cost, office cost and cost of sales for determining the cost of a product. Now, business has grown to an extent where selling and distribution expenses cannot be ignored while calculating the cost of a product. Thus, costs include 'prime cost', factory cost, cost of production, cost of goods sold and cost of sales.

Cost accounting (CA) has come to occupy a prominent place in a company's management accounting process. In order to develop the best methods to increase a company's profitability and save company's money, CA proves to be a system necessary to the management of the company's affairs.

According to Charles T. Horngren, CA is a quantitative method that accumulates, classifies, summarizes and interprets information for the following three major purposes:

- Operational planning and control
- Special decisions
- Product decisions

According to the Chartered Institute of Management Accountants, London, CA is the process of accounting for costs from the point at which expenditure is incurred with cost units.

John Wilmot, an expert in accounting, summarized the nature of CA as 'the analyzing, recording, standardizing, forecasting, comparing, reporting and recommending' and the role of a cost accountant as 'a historian, news agent and prophet'.

EVOLUTION OF CA

CA is a form of accounting that developed due to the limitations of financial accounting (FA). FA does not give a clear picture of the operating efficiency of a firm, namely, what should be the price of a product, what is the desired sale, what is the desired profit, whether a product should be manufactured or purchased, and what are the reasons for making profits or incurring losses.

In other words, FA does not reveal the managerial aspects of accounting. It merely provides the historical events in the form of numbers that took place in an organization. This led to the growth of CA.

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Formerly, CA was considered a technique for the ascertainment of costs of products or services on the basis of

historical data. Due to changes in the nature of market, controlling cost was considered more important than ascertaining cost. Thus, CA started to be considered more a technique for cost control than one for cost ascertainment. It can be concluded that CA is concerned with recording, classifying and summarizing costs for the determination of costs of products or services; planning, controlling and reducing such costs; and furnishing of information to a company's management for decision making.

In its widest sense, CA embraces the preparation of statistical data, application of cost control methods and ascertainment of the profitability of the activities carried out or planned.

Cost

'Cost is the amount spent on goods or services received.'

'Cost represents the resources that have been sacrificed to attain a particular objective.'

'Cost is the value of economic resources expended as a result of producing or manufacturing.'

COST ACCOUNTING

CA is the application of accounting costing principles, methods and techniques in the ascertainment of costs.

CA is the technique and process of ascertainment of costs.

CA involves cost ascertainment, cost presentation and cost control.

IMPORTANCE OF CA TO BUSINESS CONCERNS

CA helps business houses in the following areas of operations:

1. **Control of material cost:** Cost of materials usually constitutes a substantial portion of the total cost of a product. CA helps in controlling the cost of materials.
2. **Control of labour cost:** Labour cost can be controlled when workers complete their work within the standard time limit. Reduction of labour turnover and idle time too help to control labour cost.
3. **Control of overheads:** Overheads consist of indirect expenses, which are incurred in the factory, office and sales department; they are part of production and sales cost. By keeping a strict check on overheads, a firm can control such expenses.
4. **Measuring efficiency:** For measuring efficiency, CA department should provide information about standards and actual performance of the activity concerned.

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5. **Budgeting:** Budget preparation is the function of costing department.
6. **Price determination:** Cost accounts provide information to fix remunerative selling prices for various items of products and services.
7. **Expansion:** Cost accounts provide estimates of production of various products.
8. **Arriving at decisions:** Cost accounts help business houses to make the proper decision at the right time.

ADVANTAGES OF CA

As discussed in Section 1.2, the limitations of FA are the chief advantages of CA. The advantages are grouped into four categories. They are as follows:

To the management:

1. In fixing prices
2. In fixing profit
3. In fixing sales
4. In selecting a sales mix
5. In selecting an alternate production pattern
6. In determining the future course of action
7. In fixing remuneration to workers

To the employees:

1. In fixing a sound wage policy
2. In fixing a suitable bonus plan
3. In distinguishing between efficient and inefficient workers
4. In fixing appropriate incentive schemes to employees

To the government:

1. In facilitating the assessment of excise duty
2. In facilitating the assessment of income tax
3. In facilitating the formation of policies regarding industry

To the public:

1. With control over costs, the prices are fair
2. With control over wastage, the quality is better
3. Cause overall growth of industries and employment

LIMITATIONS OF CA

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1. **Not applicable to small business concerns:** It is generally believed that costing cannot be applied to concerns of small sizes. There is no single method of costing that can be applied to all types of businesses.
2. **Expensive:** Expenses involved in installing a costing system is disproportionate to the benefits received from it.
3. **Not reliable:** CA, as against FA, is based on estimates. It is generally believed that decisions made and conclusions drawn based on CA are not reliable.
4. **Not an exact science:** CA developed because of the limitations of FA. Many theories have also been developed in the light of convention and basic principles. These are not static, but change with time and circumstances. Hence CA is not an exact science, but an approximate science.
5. **No Uniform procedures and methods:** The procedures and methods of CA followed by different organizations are not uniform and, therefore, they provide different results for the same information.
6. **Based on estimation and conventions:** In CA, some elements of costs like indirect costs are charged on the basis of estimations. These are the actual costs and they differ from the estimates. Thus, the result derived from CA can be misleading.

OBJECTIVES OF COST ACCOUNTING

The main objectives of Cost Accounting are as follows : (i) Ascertainment of cost, (ii) Determination of selling price, (iii) Cost control and cost reduction, (iv) Ascertaining the profit of each activity, (v) Assisting management in decision-making.

Ascertainment of Cost

There are two methods of ascertaining costs, viz., Post Costing and Continuous Costing.

Post Costing means, analysis of actual information as recorded in financial books. It is accurate and is useful in the case of "Cost plus Contracts" where price is to be determined finally on the basis of actual cost.

Continuous Costing, aims at collecting information about cost as and when the activity takes place so that as soon as a job is completed the cost of completion would be known. This involves careful estimates being prepared of overheads. In order to be of any use, costing must be a continuous process.

Cost ascertained by the above two methods may be compared with the standard costs which are the target figures already compiled on the basis of experience and experiments.

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Determination of selling price

Though the selling price of a product is influenced by market conditions, which are beyond the control of any business, it is still possible to determine the selling price within the market constraints. For this purpose, it is necessary to rely upon cost data supplied by Cost Accountants.

Cost control and cost reduction

“The guidance and regulation, by executive action of the cost of operating an undertaking”. The word “guidance” indicates a goal or target to be guided; ‘regulation’ indicates taking action where there is a deviation from what is laid down; executive action denotes action to “regulate” must be initiated by executives i.e. persons responsible for carrying out the job or the operation; and all this is to be exercised through modern methods of costing in respect of expenses incurred in operating an undertaking. To exercise cost control, broadly speaking the following steps should be observed:

- (i) Determine clearly the objective, i.e., pre-determine the desired results;
- (ii) Measure the actual performance;
- (iii) Investigate into the causes of failure to perform according to plan; and
- (iv) Institute corrective action.

The target cost and/or targets of performance should be laid down in respect of each department or operation and these targets should be related to individuals who, by their action, control the actual and bring them into line with the targets. Actual cost of performance should be measured in the same manner in which the targets are set up, i.e. if the targets are set up operation-wise, then the actual costs should also be collected operation-wise and not cost centre or department-wise as this would make comparison difficult. Cost Reduction, may be defined “as the achievement of real and permanent reduction in the unit cost of goods manufactured or services rendered without impairing their suitability for the use intended or diminution in the quality of the product.”

Cost reduction should not be confused with Cost control. Cost saving could be a temporary affair and may be at the cost of quality. Cost reduction implies the retention of the essential characteristics and quality of the product and thus it must be confined to permanent and genuine savings in the cost of manufacture, administration, distribution and selling, brought about by elimination of wasteful and inessential elements from the design of the product and from the techniques carried out in connection therewith. In other words, the essential characteristics and quality of the products are retained through improved methods and techniques and thereby a permanent reduction in unit cost is achieved. The definition of cost reduction does not, however, include reduction in expenditure arising from reduction in taxation or similar Government action or the effect of price agreements.

The three-fold assumptions involved in the definition of cost reduction may be summarized as under:

- (a) There is a saving in unit cost.
- (b) Such saving is of permanent nature.
- (c) The utility and quality of the goods and services remain unaffected, if not improved.

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Ascertaining the profit of each activity

The profit of any activity can be ascertained by matching cost with the revenue of that activity. The purpose under this step is to determine costing profit or loss of any activity on an objective basis.

Assisting management in decision making

Decision making is defined as a process of selecting a course of action out of two or more alternative courses. For making a choice between different courses of action, it is necessary to make a comparison of the outcomes, which may be arrived under different alternatives. Such a comparison has only been made possible with the help of Cost Accounting information.

DISTINCTION BETWEEN COST AND FINANCIAL ACCOUNTING

Even though, cost accounting and financial accounting are using the same method/materials for recording and analyzing the transactions, the two systems different in their purpose and scope. Main points of differences are given below:

Basis	Financial Accounting	Cost Accounting
(i) Objective	It provides information about the financial performance and financial position of the business.	It provides information of ascertainment of cost to control cost and for decision making about the cost.
(ii) Nature	It classifies records, presents and interprets transactions in terms of money.	It classifies, records, presents, and interprets in a significant manner the material, labour and overheads cost.
(iii) Recording of data	It records Historical data.	It also records and presents the estimated/budgeted data. It makes use of both the historical costs and pre-determined costs.
(iv) Users of information	The users of financial accounting statements are shareholders, creditors, financial analysts and government and its agencies, etc.	The cost accounting information is used by internal management at different levels.
(v) Analysis of costs and profits	It shows the profit/ loss of the organisation.	It provides the details of cost and profit of each product, process, job, contracts, etc.
(vi) Time period	Financial Statements are prepared for a definite period, usually a year.	Its reports and statements are prepared as and when required.
(vii) Time period	Financial Statements are prepared for a definite period, usually a year.	Its reports and statements are prepared as and when required.
(viii) Presentation of information	A set format is used for presenting financial information.	There are not any set formats for presenting cost information.

SHORT RUN COST – OUTPUT RELATION

In this note we consider production costs in the short run, in particular the difference between fixed and variable costs and the relationships between marginal and average costs.

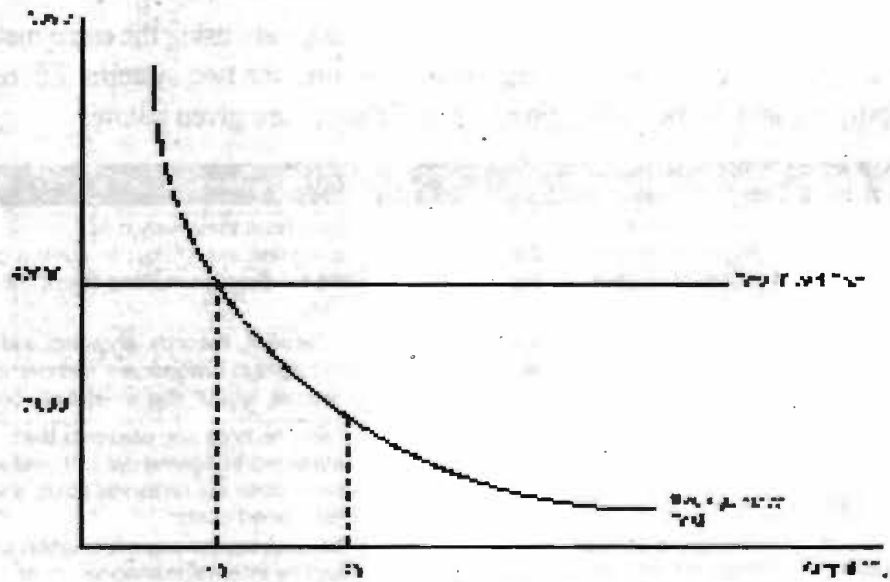
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In the short run, because at least one factor of production is fixed, output can be increased only by adding more variable factors. Hence we consider both fixed and variable costs.

Fixed costs Fixed costs are business expenses that do not vary directly with the level of output i.e. they are treated as independent of the level of production.

Examples of fixed costs include the rental costs of buildings; the costs of leasing or purchasing capital equipment such as plant and machinery; the annual business rate charged by local authorities; the costs of full-time contracted salaried staff, the costs of meeting interest payments on loans; the depreciation of fixed capital (due solely to age) and also the costs of business insurance.

Figure 10.1: The short-run cost-output relation. The vertical axis represents cost and the horizontal axis represents output. The horizontal line represents total fixed cost (TFC). The downward-sloping curve represents average fixed cost (AFC). The vertical distance between the TFC line and the AFC curve represents average variable cost (AVC). The vertical distance between the AFC curve and the AVC curve represents marginal cost (MC).



Fixed costs are the **overhead costs** of a business. They are important in markets where the fixed costs are high but the variable costs associated with making a small increase in output are relatively low. We will come back to this when we consider **economies of scale**.

- Total fixed costs (TFC) remain constant as output increases.
- Average fixed cost (AFC) = total fixed costs divided by output.

Average fixed costs must fall continuously as output increases because total fixed costs are being spread over a higher level of production. In industries where

the ratio of fixed to variable costs is extremely high, there is great scope for a business to exploit lower fixed costs per unit if it can produce at a big enough size. Consider the new Sony portable play station. The fixed costs of developing the product are enormous, but these costs can be divided by millions of individual units sold across the world.

A change in fixed costs has no effect on marginal costs. Marginal costs relate only to variable costs!

Variable Costs

Variable costs are costs that **vary directly with output**. Examples of variable costs include the costs of **intermediate raw materials** and other components, the wages of part-time staff or employees paid by the hour, the costs of electricity and gas and the depreciation of capital inputs due to wear and tear. Average variable cost (AVC) = total variable costs (TVC) / output (Q).



Variable costs are those associated with changes in short run production - what are the variable costs associated with an increase in the production of Californian wine shown in the picture above?

Average Total Cost (ATC or AC)

Average total cost is simply the cost per unit produced

Average total cost (ATC) = total cost (TC) / output (Q)

Marginal Cost

Marginal cost is the change in total costs from increasing output by one extra unit.

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The marginal cost of supplying an extra unit of output is linked with the marginal productivity of labour. The law of diminishing returns implies that the marginal cost of production will rise as output increases. Eventually, rising marginal cost will lead to a rise in average total cost. This happens when the rise in AVC is greater than the fall in AFC as output (Q) increases.

Worked example of short run production costs

A simple numerical example of short run costs is shown in the table below. Fixed costs are assumed to be constant at £200. Variable costs increase as more output is produced.

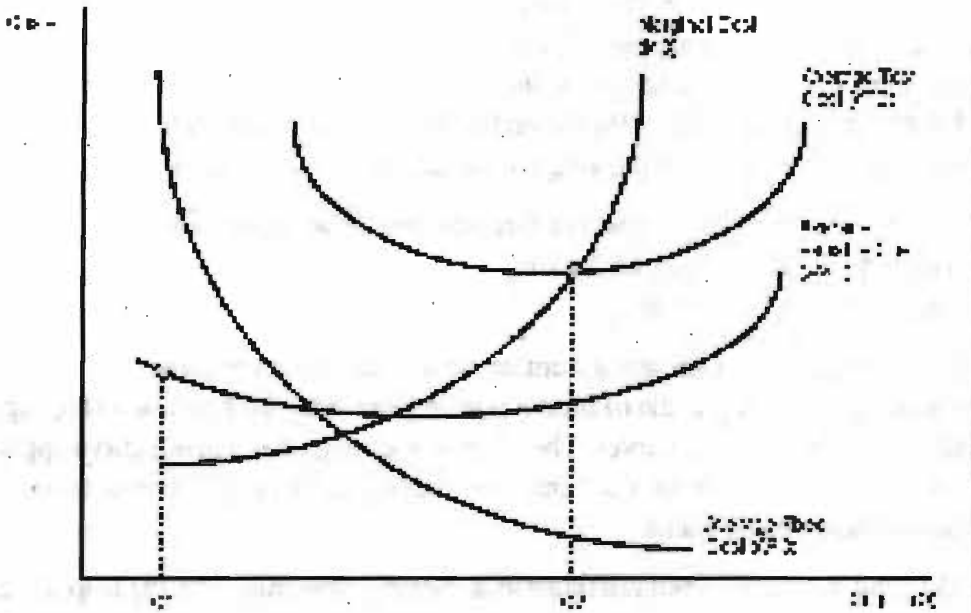
Output (Q)	Total Fixed Costs (TFC)	Total Variable Costs (TVC)	Total Cost	Average Cost Per Unit	Marginal Cost (the change in total cost from a one unit change in output)
			(TC = TFC + TVC)	(AC = TC/Q)	
0	200	0	200		
50	200	100	300	6	2
100	200	180	400	4	2
150	200	230	450	3	1
200	200	260	460	2.3	0.2
250	200	280	465	1.86	0.1
300	200	290	480	1.6	0.3
350	200	325	525	1.5	0.9
400	200	400	600	1.5	1.5
450	200	610	810	1.8	4.2
500	200	750	1050	2.1	4.8

In our example, average cost per unit is minimised at a range of output between 350 and 400 units. Thereafter, because the marginal cost of production exceeds the previous average, so the average cost rises (for example the marginal cost of each extra unit between 450 and 500 is 4.8 and this increase in output has the effect of raising the cost per unit from 1.8 to 2.1).

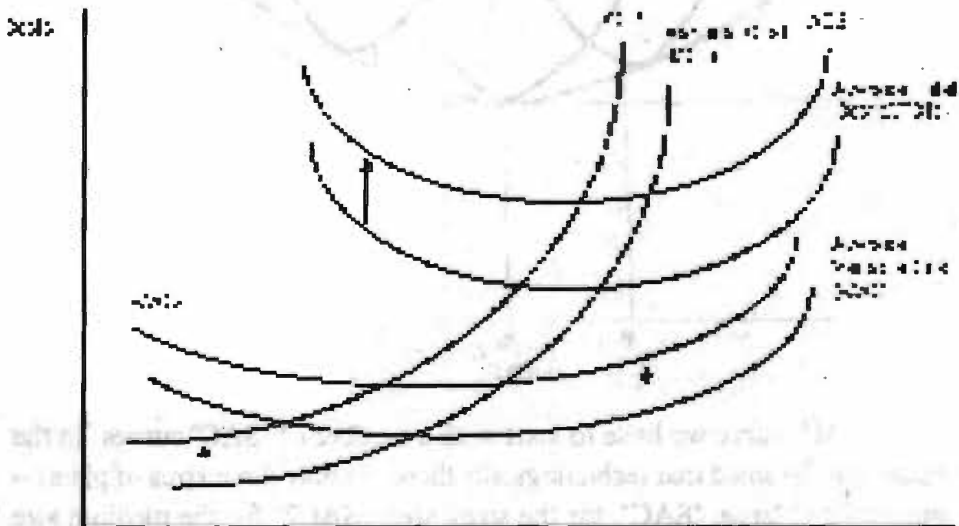
Short Run Cost Curves

When diminishing returns set in (beyond output Q1) the marginal cost curve starts to rise. Average total cost continues to fall until output Q2 where the rise in average variable cost equates with the fall in average fixed cost. Output Q2 is the lowest point of the ATC curve for this business in the short run. This is known as the output of productive efficiency.

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A change in variable costs A rise in the variable costs of production leads to an upward shift both in marginal and average total cost. The firm is not able to supply as much output at the same price. The effect is that of an inward shift in the supply curve of a business in a competitive market.



An increase in fixed costs has no effect at all on variable costs of production. This means that only the average total cost curve shifts. There is no change at all on the marginal cost curve leading to no change in the profit maximizing price and output of a business. The effects of an increase in the fixed or overhead costs of a business are shown in the diagram below.

COST-OUTPUT RELATIONSHIP IN THE LONG-RUN

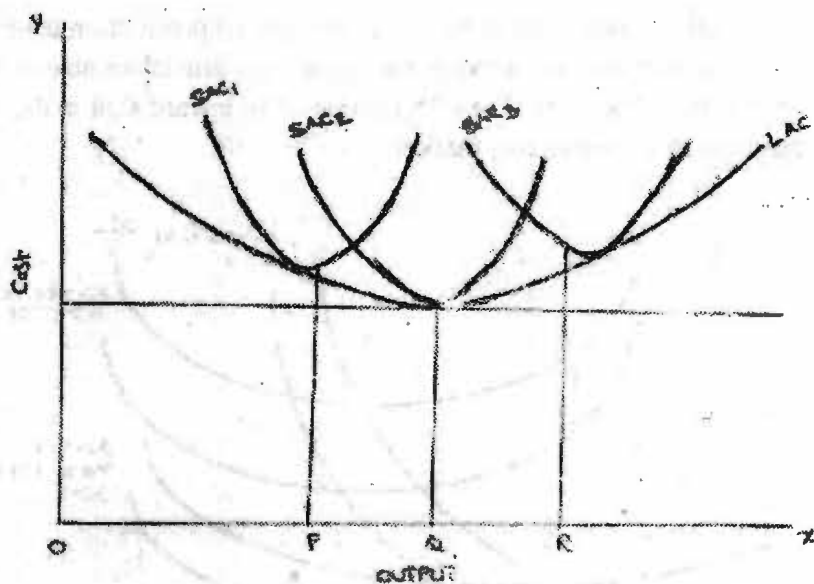
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Long run is a period, during which all inputs are variable including the one, which are fixed in the short-run. In the long run a firm can change its output according to its demand. Over a long period, the size of the plant can be changed, unwanted buildings can be sold staff can be increased or reduced. The long run enables the firms to expand and scale of their operation by bringing or purchasing larger quantities of all the inputs. Thus in the long run all factors become variable.

The long-run cost-output relations therefore imply the relationship between the total cost and the total output. In the long-run cost-output relationship is influenced by the law of returns to scale.

In the long run a firm has a number of alternatives in regards to the scale of operations. For each scale of production or plant size, the firm has an appropriate short-run average cost curves. The short-run average cost (SAC) curve applies to only one plant whereas the long-run average cost (LAC) curve takes in to consideration many plants.

The long-run cost-output relationship is shown graphically with the help of 'LCA' curve.



To draw on 'LAC' curve we have to start with a number of 'SAC' curves. In the above figure it is assumed that technologically there are only three sizes of plants – small, medium and large, 'SAC', for the small size, 'SAC2' for the medium size plant and 'SAC3' for the large size plant. If the firm wants to produce 'OP' units of output, it will choose the smallest plant. For an output beyond 'OQ' the firm will optimum for medium size plant. It does not mean that the OQ production is not possible with small plant. Rather it implies that cost of production will be more with small plant compared to the medium plant.

For an output 'OR' the firm will choose the largest plant as the cost of production will be more with medium plant. Thus the firm has a series of 'SAC' curves. The 'LCA' curve drawn will be tangential to the entire family of 'SAC' curves i.e. the

'LAC' curve touches each 'SAC' curve at one point, and thus it is known as envelope curve. It is also known as planning curve as it serves as guide to the entrepreneur in his planning to expand the production in future. With the help of 'LAC' the firm determines the size of plant which yields the lowest average cost of producing a given volume of output it anticipates.

ECONOMIES OF SCALE

When more units of a good or a service can be produced on a larger scale, yet with (on average) less input costs, economies of scale (ES) are said to be achieved. Alternatively, this means that as a company grows and production units increase, a company will have a better chance to decrease its costs. According to theory, economic growth may be achieved when economies of scale are realized.

Adam Smith identified the division of labor and specialization as the two key means to achieve a larger return on production. Through these two techniques, employees would not only be able to concentrate on a specific task, but with time, improve the skills necessary to perform their jobs. The tasks could then be performed better and faster. Hence, through such efficiency, time and money could be saved while production levels increased.

Internal and External Economies of Scale

Alfred Marshall made a distinction between internal and external economies of scale. When a company reduces costs and increases production, internal economies of scale have been achieved. External economies of scale occur outside of a firm, within an industry. Thus, when an industry's scope of operations expands due to, for example, the creation of a better transportation network, resulting in a subsequent decrease in cost for a company working within that industry, external economies of scale are said to have been achieved. With external ES, all firms within the industry will benefit.

Where Are Economies of Scale?

In addition to specialization and the division of labor, within any company there are various inputs that may result in the production of a good and/or service.

- **Lower input costs:** When a company buys inputs in bulk - for example, potatoes used to make French fries at a fast food chain - it can take advantage of volume discounts. (In turn, the farmer who sold the potatoes could also be achieving ES if the farm has lowered its average input costs through, for example, buying fertilizer in bulk at a volume discount.)
- **Costly inputs:** Some inputs, such as research and development, advertising, managerial expertise and skilled labor are expensive, but because of the possibility of increased efficiency with such inputs, they can lead to a decrease in the average cost of production and selling. If a company is able to spread the cost of such inputs over an increase in its production units, ES can be realized. Thus, if the fast food chain chooses to spend more money on technology to eventually increase efficiency by lowering the average cost of

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hamburger assembly, it would also have to increase the number of hamburgers it produces a year in order to cover the increased technology expenditure.

- **Specialized inputs:** As the scale of production of a company increases, a company can employ the use of specialized labor and machinery resulting in greater efficiency. This is because workers would be better qualified for a specific job - for example, someone who only makes French fries - and would no longer be spending extra time learning to do work not within their specialization (making hamburgers or taking a customer's order). Machinery, such as a dedicated French fry maker, would also have a longer life as it would not have to be over and/or improperly used.
- **Techniques and Organizational inputs:** With a larger scale of production, a company may also apply better organizational skills to its resources, such as a clear-cut chain of command, while improving its techniques for production and distribution. Thus, behind the counter employees at the fast food chain may be organized according to those taking in-house orders and those dedicated to drive-thru customers.
- **Learning inputs:** Similar to improved organization and technique, with time, the learning processes related to production, selling and distribution can result in improved efficiency - practice makes perfect!

External economies of scale can also be realized from the above-mentioned inputs as a result of the company's geographical location. Thus all fast food chains located in the same area of a certain city could benefit from lower transportation costs and a skilled labor force. Moreover, support industries may then begin to develop, such as dedicated fast food potato and/or cattle breeding farms.

External economies of scale can also be reaped if the industry lessens the burdens of costly inputs, by sharing technology or managerial expertise, for example. This spillover effect can lead to the creation of standards within an industry.

DISECONOMIES OF SCALE

Just like there are economies of scale, diseconomies of scale (DS) also exist. This occurs when production is less than in proportion to inputs. What this means is that there are inefficiencies within the firm or industry resulting in rising average costs.

As we mentioned before, diseconomies may also occur. They could stem from inefficient managerial or labor policies, over-hiring or deteriorating transportation networks (external DS). Furthermore, as a company's scope increases, it may have to distribute its goods and services in progressively more dispersed areas. This can actually increase average costs resulting in diseconomies of scale. Some efficiencies and inefficiencies are more location specific, while others are not affected by area. If a company has many plants throughout the country, they can all benefit from costly inputs such as advertising. However, efficiencies and inefficiencies can alternatively stem from a particular location, such as a good or bad climate for farming. When ES or DS are location specific, trade is used in order to gain access to the efficiencies.

COST FUNCTION AND COST CURVE

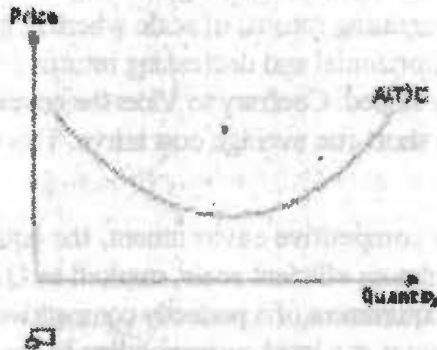
In economics, a **cost curve** is a graph of the costs of production as a function of total quantity produced. In a free market economy, productively efficient firms use these curves to find the optimal point of production (minimizing cost), and profit maximizing firms can use them to decide output quantities to achieve those aims. There are various types of cost curves, all related to each other, including total and average cost curves, and marginal ("for each additional unit") cost curves, which are the equal to the differential of the total cost curves. Some are applicable to the short run, others to the long run.

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Short-run average variable cost curve (SRAVC)

Average variable cost (which is a short-run concept) is the variable cost (typically labor cost) per unit of output: $SRAVC = wL / Q$ where w is the wage rate, L is the quantity of labor used, and Q is the quantity of output produced. The SRAVC curve plots the short-run average variable cost against the level of output, and is typically drawn as U-shaped.

Short-run average total cost curve (SRATC or SRAC)



Typical short run average cost curve

The average total cost curve is constructed to capture the relation between cost per unit of output and the level of output. A perfectly competitive and productively efficient firm organizes its factors of production in such a way that the average cost of production is at the lowest point. In the short run, when at least one factor of production is fixed, this occurs at the output level where it has enjoyed all possible average cost gains from increasing production. This is at the minimum point in the diagram on the right.

Short-run total cost is given by

$$STC = P_K K + P_L L,$$

Where P_K is the unit price of using physical capital per unit time, P_L is the unit price of labor per unit time (the wage rate), K is the quantity of physical capital used, and L is the quantity of labor used. From this we obtain short-run average cost, denoted either SATC or SAC, as STC / Q :

$$SRATC \text{ or } SRAC = P_K K/Q + P_L L/Q = P_K / AP_K + P_L / AP_L,$$

Check Your Progress:

1. Define fixed cost.
2. Fixed cost is also known as _____.
3. Define economies of scale.
4. When does diseconomies occurs?

Where $AP_K = Q/K$ is the average product of capital and $AP_L = Q/L$ is the average product of labor.

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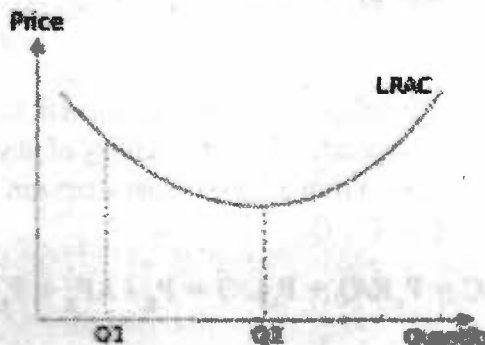
Short run average cost equals average fixed costs plus average variable costs. Average fixed cost continuously falls as production increases in the short run, because K is fixed in the short run. The shape of the average variable cost curve is directly determined by increasing and then diminishing marginal returns to the variable input (conventionally labor).

LONG RUN AVERAGE COST CURVE

The long-run average cost curve depicts the cost per unit of output in the long run—that is, when all productive inputs' usage levels can be varied. All points on the line represent least-cost factor combinations; points above the line are attainable but unwise, while points below are unattainable given present factors of production. The behavioral assumption underlying the curve is that the producer will select the combination of inputs that will produce a given output at the lowest possible cost. Given that LRAC is an *average* quantity, one must not confuse it with the long-run *marginal* cost curve, which is the cost of one more unit. The LRAC curve is created as an envelope of an infinite number of short-run average total cost curves, each based on a particular fixed level of capital usage. The typical LRAC curve is U-shaped, reflecting increasing returns of scale where negatively-sloped, constant returns to scale where horizontal and decreasing returns (due to increases in factor prices) where positively sloped. Contrary to Viner the envelope is not created by the minimum point of each short-run average cost curve. This mistake is recognized as Viner's Error

In a long-run perfectly competitive environment, the equilibrium level of output corresponds to the minimum efficient scale, marked as Q_2 in the diagram. This is due to the zero-profit requirement of a perfectly competitive equilibrium. This result, which implies production is at a level corresponding to the lowest possible average cost, does not imply that production levels other than that at the minimum point are not efficient. All points along the LRAC are productively efficient, by definition, but not all are equilibrium points in a long-run perfectly competitive environment.

In some industries, the bottom of the LRAC curve is large in comparison to market size (that is to say, for all intents and purposes, it is always declining and economies of scale exist indefinitely). This means that the largest firm tends to have a cost advantage, and the industry tends naturally to become a monopoly, and hence is called a natural monopoly. Natural monopolies tend to exist in industries with high capital costs in relation to variable costs, such as water supply and electricity supply



SUMMARY

Economic theory of the firm begins with theory of production. What is a firm? The essence of a firm is to buy inputs, convert them to outputs, and sell these outputs to consumers, firms or government. Therefore a firm is poised between two markets. It is a demander in factor markets. It buys the inputs required for production in factor markets (markets that supply inputs for firms). It is a supplier in market for goods and services. It has to adjust its production to satisfy the demand curve of its customers at profit.

It is assumed that the firm or the owner of the firm always strives to produce efficiently, or at lowest cost. He will always attempt to produce the maximum level of output for a given dose of inputs avoiding waste whenever possible.

ANSWERS TO CHECK YOUR PROGRESS

1. Fixed costs are business expenses that do not vary directly with the level of output i.e. they are treated as **independent** of the level of production.
2. Overhead costs
3. When more units of a good or a service can be produced on a larger scale, yet with (on average) less input costs, economies of scale (ES) are said to be achieved.
4. This occurs when production is less than in proportion to inputs.

EVALUATE YOURSELF

1. What is the significance of Theory of Production cost?
2. Explain the concept of Short run average cost.
3. Throw a light on Long run average cost curve.
4. Explain in detail Economies of scale.
5. Comment on Short run average variable cost curve.

CASE

PSE&G, a regulated utility that delivers gas and electric service to more than 70 percent of New Jersey, is a great example of an energy company thinking innovatively in terms of customer experience. In short, the utility was looking to transform their customer care operations and improve the customer experience while also reducing the cost to serve, through technology innovation and process and via architecture simplification. Through a program launched in Spring 2009 called "iPower," they've seen great results already, providing a terrific case study in utilizing technology to improve customer contact.

On the consumer end, iPower allows customers to manage their entire account online, and its first week live, nearly 50,000 customers registered for the self-service site. Internally, PSE&G had six very clear objectives when launching the initiative:

1. Achieve first quartile performance in customer service quality metrics
2. Availability of real-time information to customer service representatives

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3. Respond rapidly to changing regulatory requirements
4. Enhanced customer service through process automation
5. Reduction of operations and maintenance costs
6. Increased system availability and reliability

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Manoj Chouthai, the Vice President of IT and CIO of PSEG, spoke this week at the SAP Sapphire event in Orlando to discuss the progress organizationally that PSE&G has seen in two short years.

“All the challenges we had were in externally facing systems, so we had to transform the entire customer experience,” Chouthai noted. “Our biggest problem was integration, so we partnered with firms that we thought would bring value to the mix, namely Tata Consultancy. In my eyes, I have a simple belief: operational excellence is about financial strength, which in turn drives innovation.”

Hasit Kaji, the VP and Global Head of Energy at Tata Consultancy Services, then spoke about how in developing the new platform, there were two fundamental adoption levers:

1. How they completed the continuous improvements framework?
2. What governance model was needed for operational excellence and innovation?

“We wanted to make sure that we reduced the call traffic at the call center, so in situations where there was a wait, we enabled a system where the customer lived behind his or her number, and the agent would get a popup on their screen to call back,” said Kaji. “This really helped not only to improve customer service but also in reducing the load on agents, a huge step in the right direction.”

Chouthai admitted there were plenty of early growing pains in the process and that every customer didn't love the new system, but also noted that it took PSE&G about 10 months to meet and exceed their expected metrics on iPower. Some fascinating stats about the success of the program included:

- An 85% reduction in average batch failures from 85 per day to less than 2 per day
- An improved service level from 62.7 to 83.1%
- A reduction in incident backlog reduction from 2,300 to 130 in one year
- A 95% reduction in critical cross-system replication and communication queue error backlogs
- 729,281 web accounts initiated as of February 2011 (compared to none only two years ago)

Yet again, adoption of new technologies takes time, and PSE&G showed some innovative thinking in the creation and implementation of their iPower project.

Any thoughts? How would your energy experience improve or be affected by a system like iPower?

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The Unit Include:

- Introduction
- Objectives of Purchasing:
- Functions of Purchasing Department:
- Parameters of Purchasing:
- Purchasing Procedure:
- Selection of Suppliers
- Special Purchasing Systems
- Purchasing Organization
- Vendor Rating
- Criteria for Evaluation
- Awards and Certification
- Benefits
- Stores Relations with Other Functions
- Advantages and Disadvantages of a Centralized Store
- Responsibilities of a Store
- Types of Stores
- Functions and Responsibilities of Stores Department in Detail
- Storage/custody and Preservation.
- Accounting Materials.
- Disposal of Obsolete/surplus /unserviceable/scrap items.
- Physical Certification of Stores:
- Subcontractor Agreement
- Factors Affecting sub Contractors Rate Fixing
- Meaning and Definition of Labour Cost
- Accounting of Labour Cost
- Types of Labor Costs
- Chapter Summary
- Case
- Test yourself

Learning Objectives:

After going through this chapter, you should be able to:

- Define what is purchasing.
- Describe the importance of purchasing in organizations.
- Discuss stores management.
- Understand various problems of stores management.

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INTRODUCTION

Purchasing is an important function of materials management. In any industry purchase means buying of equipments, materials, tools, parts etc. required for industry. The importance of the purchase function varies with nature and size of industry. In small industry, this function is performed by works manager and in large manufacturing concern; this function is done by a separate department. The moment a buyer places an order he commits a substantial portion of the finance of the corporation which affects the working capital and cash flow position. He is a highly responsible person who meets various salesmen and thus can be considered to have been contributing to the public relations efforts of the company. Thus, the buyer can make or mar the company's image by his excellent or poor relations with the vendors.

According to Alford and Beaty, "Purchasing is the procuring of materials, supplies, machine tools and services required for the equipment, maintenance and operation of the manufacturing plant."

OBJECTIVES OF PURCHASING:

The basic objective of the purchasing function is to ensure continuity of supply of raw materials, sub-contracted items and spare parts and to reduce the ultimate cost of the finished goods. In other words, the objective is not only to procure the raw materials at the lowest price but to reduce the cost of the final product.

The objectives of the purchasing department can be outlined as under:

- 1) **To avail the materials, suppliers and equipments at the minimum possible costs:** These are the inputs in the manufacturing operations. The minimization of the input cost increases the productivity and resultantly the profitability of the operations.
- 2) **To ensure the continuous flow of production** through continuous supply of raw materials, components, tools etc. with repair and maintenance service.
- 3) **To increase the asset turnover:** The investment in the inventories should be kept minimum in relation to the volume of sales. This will increase the turnover of the assets and thus the profitability of the company.
- 4) **To develop an alternative source of supply:** Exploration of alternative sources of supply of materials increases the bargaining ability of the buyer, minimization of cost of materials and increases the ability to meet the emergencies.
- 5) **To establish and maintain the good relations with the suppliers:** Maintenance of good relations with the supplier helps in evolving a favorable image in the business circles. Such relations are beneficial to the buyer in terms of changing the reasonable price, preferential allocation of material in case of material shortages, etc.
- 6) **To achieve maximum integration with other department of the company:** The purchase function is related with production department for specifications and flow of material, engineering department for the purchase

of tools, equipments and machines, marketing department for the forecasts of sales and its impact on procurement of materials, financial department for the purpose of maintaining levels of materials and estimating the working capital required, personnel department for the purpose of manning and developing the personnel of purchase department and maintaining good vendor relationship.

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- 7) **To train and develop the personnel:** Purchasing department is manned with varied types of personnel. The company should try to build the imaginative employee force through training and development.
- 8) **Efficient record keeping and management reporting:** Paper processing is inherent in the purchase function. Such paper processing should be standardized so that record keeping can be facilitated. Periodic reporting to the management about the purchase activities justifies the independent existence of the department.

FUNCTIONS OF PURCHASING DEPARTMENT:

The main functions of the Purchase Department are defined as follows:

- 1) Procurement of stores through indigenous and foreign sources as required in accordance with the rules in force.
- 2) Checking of requisitions/purchase indents.
- 3) Selection of suppliers for issue of enquiries.
- 4) Issuing enquiries/tenders and obtaining quotations.
- 5) Analyzing quotations and bids etc., and preparation of comparative statement (quotation charts).
- 6) Consultation with the Indentor for selection and approval of quotations and with Accounts Officer for pre-audit.
- 7) Negotiating contracts.
- 8) Checking legal conditions of contracts.
- 9) Consulting Administrative Officer or Secretary, NCSM – where necessary.
- 10) Issue of Purchase Orders.
- 11) Follow-up of purchase orders for delivery in due time
- 12) Verification and passing of suppliers' bills to see that payments are made promptly.
- 13) Correspondence and dealing with suppliers, carriers etc., regarding shortages, rejections etc., reported by the Stores Department.
- 14) Maintenance of purchase records.
- 15) Maintenance of progressive expenditure statement, sub-head wise.

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- 16) Maintenance of vendor performance records/data.
- 17) Arrangement for Insurance Surveys, as and when necessary.
- 18) Clearance of foreign consignments.
- 19) Keeping various Departments/Divisions informed of the progress of their indents in case of delay in obtaining supplies.
- 20) Serving as an information center on the materials' knowledge i.e. their prices, source of supply, specification and other allied matters.
- 21) Development of reliable and alternate sources of supply.

PARAMETERS OF PURCHASING:

The success of any manufacturing activity is largely dependent on the procurement of raw materials of right quality, in the right quantities, from right source, at the right time and at right price popularly known as ten 'R's' of the art of efficient purchasing. They are described as the basic principles of purchasing. There are other well known parameters such as right contractual terms, right material, right place, right mode of transportation and right attitude are also considered for purchasing.

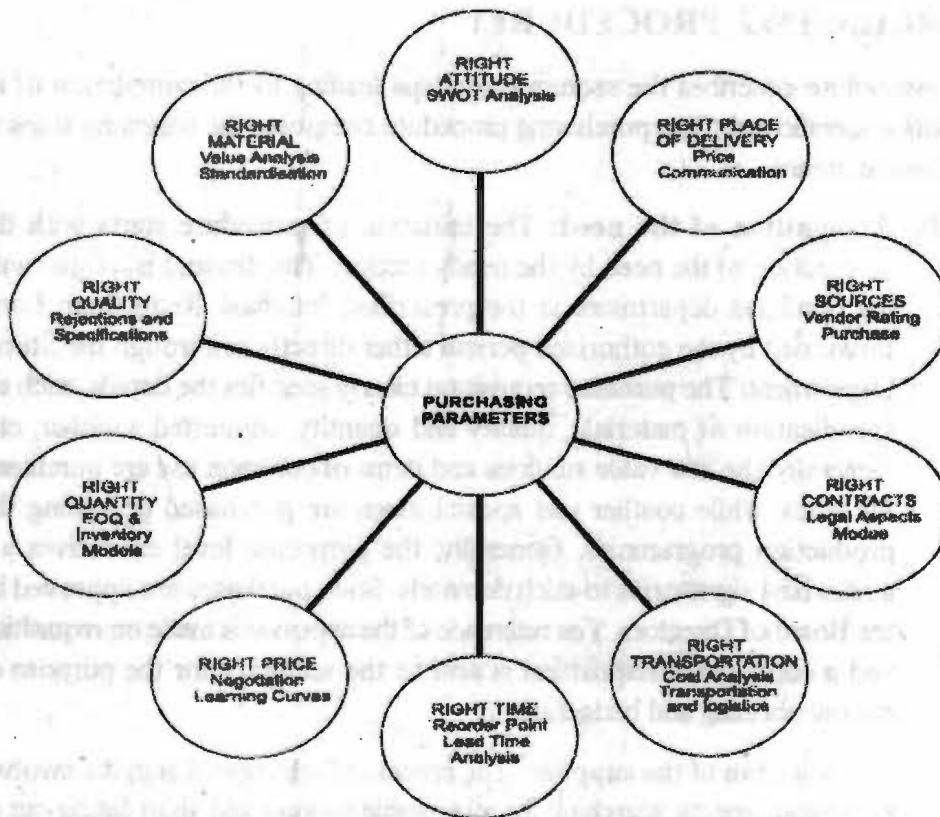
- 1) **Right price:** It is the primary concern of any manufacturing organization to get an item at the right price. But right price need not be the lowest price. It is very difficult to determine the right price; general guidance can be had from the cost structure of the product. The 'tender system' of buying is normally used in public sector organizations but the objective should be to identify the lowest 'responsible' bidder and not the lowest bidder. The technique of 'learning curve' also helps the purchase agent to determine the price of items with high labour content. The price can be kept low by proper planning and not by rush buying. Price negotiation also helps to determine the right prices.
- 2) **Right quality:** Right quality implies that quality should be available, measurable and understandable as far as practicable. In order to determine the quality of a product sampling schemes will be useful. The right quality is determined by the cost of materials and the technical characteristics as suited to the specific requirements. The quality particulars are normally obtained from the indents. Since the objective of purchasing is to ensure continuity of supply to the user departments, the time at which the material is provided to the user department assumes great importance.
- 3) **Right time:** For determining the right time, the purchase manager should have lead time information for all products and analyze its components for reducing the same. Lead time is the total time elapsed between the recognition of the need of an item till the item arrives and is provided for use. This covers the entire duration of the materials cycle and consists of pre-contractual administrative lead time, manufacturing and transporting lead time and inspection lead time. Since the inventory increases with higher lead time, it is desirable to analyze each component of the lead time so as to reduce the first and third components which are controllable. While determining the

purchases, the buyer has to consider emergency situations like floods, strikes, etc. He should have 'contingency plans' when force major clauses become operative, for instance, the material is not available due to strike, lock-out, floods, and earthquakes.

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- 4) **Right source:** The source from which the material is procured should be dependable and capable of supplying items of uniform quality. The buyer has to decide which item should be directly obtained from the manufacturer. Source selection, source development and vendor rating play an important role in buyer-seller relationships. In emergencies, open market purchases and bazaar purchases are restored to.
- 5) **Right quantity:** The right quantity is the most important parameter in buying. Concepts, such as, economic order quantity, economic purchase quantity, fixed period and fixed quantity systems, will serve as broad guidelines. But the buyer has to use his knowledge, experience and common sense to determine the quantity after considering factors such as price structure, discounts, availability of the item, favorable reciprocal relations, and make or buy consideration.



- 6) **Right attitude:** Developing the right attitude, too, is necessary as one often comes across such statement: 'Purchasing knows the price of everything and value of nothing'; 'we buy price and not cost'; 'when will our order placers become purchase managers?'; 'Purchasing acts like a post box'. Therefore, purchasing should keep 'progress' as its key activity and should be future-oriented. The purchase manager should be innovative and his long-term objective should be to minimize the cost of the ultimate product.

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He will be able to achieve this if he aims himself with techniques, such as, value analysis, materials intelligence, purchases research, SWOT analysis, purchase budget lead time analysis, etc.

- 7) **Right contracts:** The buyer has to adopt separate policies and procedures for capital and consumer items. He should be able to distinguish between indigenous and international purchasing procedures. He should be aware of the legal and contractual aspects in international practices.
- 8) **Right material:** Right type of material required for the production is an important parameter in purchasing. Techniques, such as, value analysis will enable the buyer to locate the right material.
- 9) **Right transportation:** Right mode of transportation has to be identified as this forms a critical segment in the cost profile of an item. It is an established fact that the cost of the shipping of ore, gravel, sand, etc., is normally more than the cost of the item itself.
- 10) **Right place of delivery:** Specifying the right place of delivery, like head office or works, would often minimize the handling and transportation cost.

PURCHASING PROCEDURE:

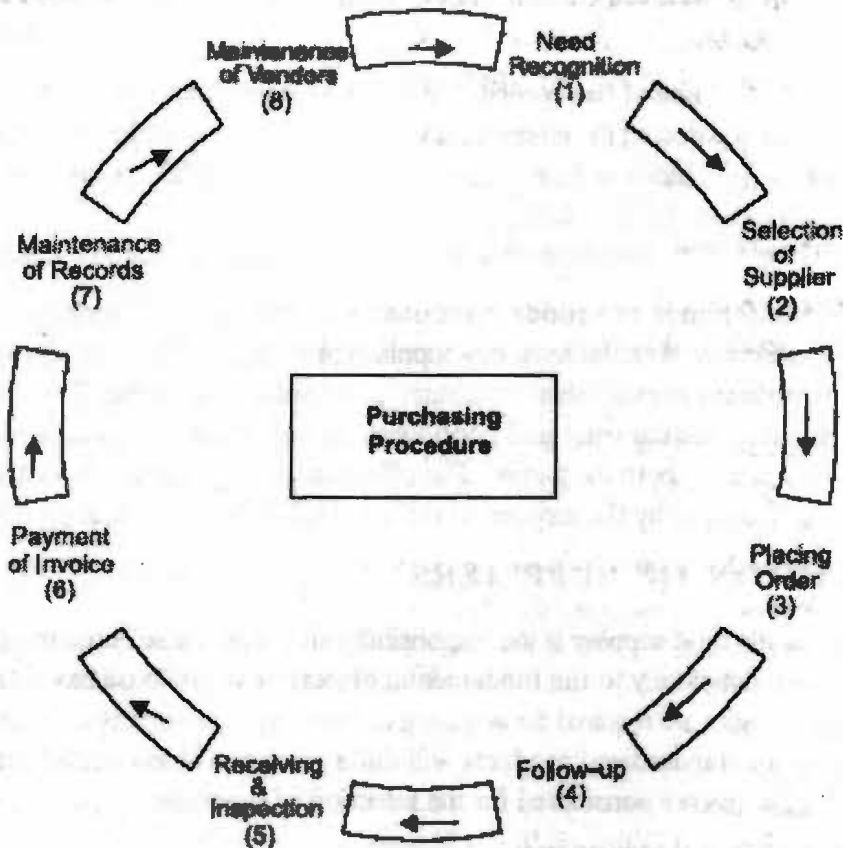
The procedure describes the sequence of steps leading to the completion of an identified specific task. The purchasing procedure comprises the following steps as indicated in figure.

- 1) **Recognition of the need:** The initiation of procedure starts with the recognition of the need by the needy section. The demand is lodged with the purchase department in the prescribed Purchase Requisition Form forwarded by the authorized person either directly or through the Stores Department. The purchase requisition clearly specifies the details, such as, specification of materials, quality and quantity, suggested supplier, etc. Generally, the low value sundries and items of common use are purchased for stock while costlier and special items are purchased according to the production programmes. Generally, the corporate level executives are authorized signatories to such demands. Such purchases are approved by the Board of Directors. The reference of the approval is made on requisition and a copy of the requisition is sent to the secretary for the purpose of overall planning and budgeting.
- 2) **The selection of the supplier:** The process of selection of supplier involves two basic aspects: searching for all possible sources and short listing out of the identified sources. The complete information about the supplier is available from various sources, such as, trade directories, advertisement in trade journals, direct mailing by the suppliers, interview with suppliers, salesmen, suggestions from business associates, visit to trade fair, participation in industries convention, etc. Identification of more and more sources helps in selecting better and economical supplier. It should be noted that the low bidder is not always the best bidder. When everything except price is equal,

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the low bidder will be selected. The important considerations in the selection are the price, ability to supply the required quantity, maintenance of quality standards, financial standing etc. It should be noted that it is not necessary to go for this process for all types of purchases. For the repetitive orders and for the purchases of low-value, small lot items, generally the previous suppliers with good records are preferred.

- 3) **Placing the order:** Once the supplier is selected the next step is to place the purchase order. Purchase order is a letter sent to the supplier asking to supply the said material. At least six copies of purchase order are prepared by the purchase section and each copy is separately signed by the purchase officer. Out these copies, one copy each is sent to store-keeper, supplier, accounts section, inspection department and to the department placing the requisition and one copy is retained by the purchase department for record.



- 4) **Follow-up of the order:** Follow-up procedure should be employed wherever the costs and risks resulting from the delayed deliveries of materials are greater than the cost of follow-up procedure, the follow-up procedure tries to see that the purchase order is confirmed by the supplier and the delivery is promised. It is also necessary to review the outstanding orders at regular intervals and to communicate with the supplier in case of need. Generally, a routine urge is made to the supplier by sending a printed post card or a circular letter asking him to confirm that the delivery is on the way or will be made as per agreement. In absence of any reply or unsatisfactory reply, the supplier may be contact through personal letter, phone, telegram and/or even personal visit.

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- 5) **Receiving and inspection of the materials:** The receiving department receives the materials supplied by the vendor. The quantity are verified and tallied with the purchase order. The receipt of the materials is recorded on the specially designed receiving slips or forms which also specify the name of the vendor and the purchase order number. It also records any discrepancy, damaged condition of the consignment or inferiority of the materials. The purchase department is informed immediately about the receipt of the materials. Usually a copy of the receiving slip is sent to the purchase department.
- 6) **Payment of the invoice:** When the goods are received in satisfactory condition, the invoice is checked before it is approved for the payment. The invoice is checked to see that the goods were duly authorized to purchase, they were properly ordered, they are priced as per the agreed terms, the quantity and quality confirm to the order, the calculations are arithmetically correct etc.
- 7) **Maintenance of the records:** Maintenance of the records is an important part and parcel of the efficient purchase function. In the industrial firms, most of the purchases are repeat orders and hence the past records serve as a good guide for the future action. They are very useful for deciding the timings of the purchases and in selecting the best source of the supply.
- 8) **Maintenance of vendor relations:** The quantum and frequency of the transactions with the same key suppliers provide a platform for the purchase department to establish and maintain good relations with them. Good relations develop mutual trust and confidence in the course of the time which is beneficial to both the parties. The efficiency of the purchase department can be measured by the amount of the goodwill it has with its suppliers.

SELECTION OF SUPPLIERS

Selection of the right supplier is the responsibility of the purchase department. It can contribute substantially to the fundamental objectives of the business enterprise. Different strategies are required for acquiring different types of materials. The selection of supplier for standardized products will differ from non-standardized products. Following factors are considered for the selection of suppliers:

A. SOURCES OF SUPPLIER

The best buying is possible only when the decision maker is familiar with all possible sources of supply and their respective terms and conditions. The purchase department should try to locate the appropriate sources of the supplier of various types of materials. This is known as 'survey stage'. A survey of the following will help in developing the possible sources of supply:

- 1) Specialized trade directories.
- 2) Assistance of professional bodies or consultants.
- 3) The buyer's guide or purchase handbook.

- 4) The manufacturer's or distributor's catalogue.
- 5) Advertisements in dailies.
- 6) Advertisement in specialized trade journals.
- 7) Trade fair exhibitions.

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B. DEVELOPMENT OF APPROVED LIST OF SUPPLIERS

The survey stage highlights the existence of the source. A business inquiry is made with the appropriate supplier. It is known as 'Inquiry Stage'. Here a short listing is made out of the given sources of suppliers in terms of production facilities and capacity, financial standing, product quality, possibility of timely supply, technical competence, manufacturing efficiency, general business policies followed, standing in the industry, competitive attitude, and interest in buying orders etc.

C. EVALUATION AND SELECTION OF THE SUPPLIER

The purchase policy and procedure differ according to the type of items to be purchased. Hence, evolution and selection of the supplier differ accordingly. The following variables to be considered while evaluating the quotations of the suppliers:

- 1) **Cost Factors:** Price, transportation cost, installation cost if any, tooling and other operations cost, incidence of sales tax and excise duty, terms of payment and cash discount are considered in cost factor.
- 2) **Delivery:** Routing and F.O.B. terms are important in determining the point at which the title to the goods passes from vendor to the buyer and the responsibility for the payment of the payment charges.
- 3) **Design and Specification Factors:** Specification compliance, specification deviations, specification advantages, important dimensions and weights are considered in line with the demonstration of sample, experience of other users, after sale services etc.
- 4) **Legal Factors:** Legal factors include warranty, cancellation provision, patent protection, public liability, federal laws and reputation compliance.
- 5) **Vendor Rating:** The evaluation of supplier or vendor rating provides valuable information which help in improving the quality of the decision. In the vendor rating three basic aspects are considered namely quality, service and price. How much weight should be given to each of these factors is a matter of judgment and is decided according to the specific need of the organization. Quality would be the main consideration in the manufacturing of the electrical equipments while price would be the prime consideration in the product having a tense competitive market and for a company procuring its requirements under the blanket contract with agreed price, the supplier rating would be done on the basis of two variables namely quality and delivery.

The Development Project Committee of the National Association of Purchasing Agents (U.S.A.) has suggested following methods for evaluating the performance of past suppliers.

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1) **The categorical plan:** Under this method the members of the buying staff related with the supplier like receiving section, quality control department, manufacturing department etc., are required to assess the performance of each supplier. The rating sheets are provided with the record of the supplier, their product and the list of factors for the evaluation purposes. The members of the buying staff are required to assign the plus or minus notations against each factor. The periodic meetings, usually at the interval of one month, are held by senior man of the buying staff to consider the individual rating of each section. The consolidation of the individual rating is done on the basis of the net plus value and accordingly, the suppliers are assigned the categories such as 'preferred', 'neutral' or 'unsatisfactory'. Such ratings are used for the future guidance. This is a very simple and inexpensive method. However, it is not precise. Its quality heavily depends on the experience and ability of the buyer to judge the situation. As compared to other methods, the degree of subjective judgment is very high as rating is based on personal whim and the vague impressions of the buyer. As the quantitative data supported by the profits do not exist, it is not possible to institute any corrective action with the vendor. The rating is done on the basis of memory, and thus it becomes only a routine exercise without any critical analysis.

2) **The weighted-point method:** The weighted-point method provides the quantitative data for each factor of evaluation. The weights are assigned to each factor of evaluation according to the need of the organization, e.g., a company decides the three factors to be considered— quality, price and timely delivery. It assigns the relative weight to each of these factors as under:

Quality 50 points

Price 30 points

Timely delivery 20 points

The evaluation of each supplier is made in accordance with the aforesaid factors and weights and the composite weighted-points are ascertained for each suppliers—A, B and C— are rated under this method. First of all the specific rating under each factor will be made and then the consolidation of all the factors will be made for the purpose of judgment.

3) **Quality rating:** Percentage of quantity accepted among the total quantity is called quality rating. In other words, the quality of the materials is judged on the basis of the degree of acceptance and rejections. For the purpose of comparison, the percentage degree of acceptance will be calculated in relation to the total lots received. **Price rating** is done on the basis of net price charged by the supplier. **Timely delivery rating** will be done comparing with the average delivery schedule of the supplier.

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- 4) **The cost-ratio plan:** Under this method, the vendor rating is done on the basis of various costs incurred for procuring the materials from various suppliers. The cost-ratios are ascertained delivery etc. The cost-ratios are ascertained for the different rating variables such as quality, price, timely delivery etc. The cost-ratio is calculated in percentage on the basis of total individual cost and total value of purchases. At the end, all such cost-ratios will be adjusted with the quoted price per unit. The plus cost-ratio will increase the unit price while the minus cost-ratio will decrease the unit price. The net adjusted unit price will indicate the vendor rating. The vendor with the lowest net adjusted unit price will be the best supplier and so on. Certain quality costs can be inspection cost, cost of defectives, reworking costs and manufacturing losses on rejected items etc. Certain delivery costs can be postage and telegrams, telephones and extra cost for quick delivery etc.

SPECIAL PURCHASING SYSTEMS

The following are some of the important purchasing systems:

FORWARD BUYING:

Forward buying or committing an organization far into the future, usually for a year. Depending upon the availability of the item, the financial policies, the economic order quantity, the quantitative discounts, and the staggered delivery, the future commitment is decided. This type of forward buying is different from speculative buying where the motive is to make capital out of the price changes, by selling the purchased items. Manufacturing organizations normally do not indulge in such buying. However, a few organizations do 'Hedge', particularly in the commodity market by selling or buying contracts.

TENDER BUYING:

In public, all semblance of favoritism, personal preferences should be avoided. As such, it is common for government departments and public sector undertakings to purchase through tenders. Private sector organizations adopt tender buying if the value of purchases is more than the prescribed limits as Rs. 50000 or Rs. 100000. The steps involved are to establish a bidders' list, solicit bids by comparing quotations and place the order with the lowest bidder. However, care has to be taken that the lowest bidder is responsible party and is capable of meeting the delivery schedule and quality requirements. Open tender system or advertisement in newspapers is common in public sector organizations. As advertising bids is costly and time consuming, most private sector organizations solicit tenders only from the renowned suppliers capable of supplying the materials.

BLANKET ORDER SYSTEM:

This system minimizes the administrative expenses and is useful for 'C' type items. It is an agreement to provide a required quantity of specified items, over a period of time, usually for one year, at an agreed price. Deliveries are made depending upon the buyer's needs. The system relieves the buyers from routine work, giving him more time for focusing attention on high value items. It requires fewer purchase

orders and thus reduces clerical work. It often achieves lower prices through quantity discounts by grouping the requirements. The supplier, under the system maintains adequate inventory to meet the blanket orders.

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ZERO STOCK:

Some firms try to operate on the basis of zero stock and the supplier holds the stock for these firms. Usually, the firms of the buyer and seller are close to each other so that the raw materials of one are the finished products of another. Alternatively, the system could work well if the seller holds the inventory and if the two parties work in close coordination. However, the price per item in this system will be slightly higher as the supplier will include the inventory carrying cost in the price. In this system, the buyer need not lock up the capital and so the purchasing routine is reduced. This is also significantly reduces obsolescence of inventory, lead time and clerical efforts in paper work. Thus, the seller can devote his marketing efforts to other customers and production scheduling becomes easy.

RATE CONTRACT:

The system of rate contract is prevalent in public sector organizations and government departments. It is common for the suppliers to advertise that they are on 'rate contract' for the specific period. After negotiations, the seller and the buyer agree to the rates of items. Application of rate contract has helped many organizations to cut down the internal administrative lead time as individual firms need to go through the central purchasing departments and can place orders directly with the suppliers. However, suppliers always demand higher prices for prompt delivery, as rate difficulty has been avoided by ensuring the delivery of a minimum quantity at the agreed rates. This procedure of fixing a minimum quantity is called the running contract and is being practiced by the railways. The buyer also has an option of increasing the quantity by 25% more than the agreed quantity under this procedure.

RECIPROCITY:

Reciprocal buying means purchasing from one's customers in preference to others. It is based on the principle "if you kill my cat, I will kill your dog", and "Do unto your customers as you would have them do unto you". Other things, like soundness from the ethics and economics point of view being equal, the principles of reciprocity can be practiced. However, a purchasing executive should not indulge in reciprocity on his initiative when the terms and conditions are not equal with other suppliers. It is often sound those less efficient manufacturers and distributors gain by reciprocity what they are unable to gain by price and quality. Since this tends to discourage competition and might lead to higher process and fewer suppliers, reciprocity should be practiced on a selective basis.

SYSTEMS CONTRACT:

This is a procedure intended to help the buyer and the sellers to reduce administrative expenses and at the same time ensure suitable controls. In this system, the original indent, duly approved by competent authorities, is shipped back with the items and avoids the usual documents like purchase orders, materials requisitions, expediting

letters and acknowledgements, delivery period price and invoicing procedure, Carborandum company in the US claims drastic reduction in inventory and elimination of 40000 purchase orders by adopting the system contracting procedure. It is suitable for low unit price items with high consumption.

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PURCHASING ORGANIZATION

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From the Materials Management and Purchasing view, the purchasing organization is responsible for all purchasing activities (including the processing of requests for quotations and purchase orders).

The purchasing organization is integrated within the organizational structure as follows:

- A purchasing organization can be assigned to several company codes. (= Corporate-group-wide purchasing).
- A purchasing organization can be assigned to one company code. (= Company-specific purchasing).
- A purchasing organization can also exist without being assigned to a company code.
- Since each plant must be assigned to a company code, the latter can be determined via the plant at the time of each procurement transaction even if the procuring purchasing organization has not been assigned to a company code.
- A purchasing organization must be assigned to one or more plants. (= Plant-specific purchasing).
- A purchasing organization can be linked to one or more other purchasing organizations. (= reference purchasing organization)
- A purchasing organization can be divided into several purchasing groups that are responsible for different operational areas.
- Each purchasing organization has its own info records and conditions for pricing.
- Each purchasing organization has its own vendor master data.
- Each purchasing organization evaluates its own vendors using MM Vendor Evaluation.
- Authorizations for processing purchasing transactions can be assigned to each purchasing organization.
- All items of an external purchasing document, that is, request for quotation, purchase order, contract, or scheduling agreement, belong to a purchasing organization.
- The purchasing organization is the highest level of aggregation (after the organizational unit "client") for purchasing statistics.
- The purchasing organization serves as the selection criterion for of one plant.

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All of these forms can co-exist within a single client.

Corporate-group-wide purchasing

A purchasing organization is responsible for the purchasing activities of different company codes. In this case, you do not assign a company code to the purchasing organization, but specify the company code concerned for each individual purchasing transaction. You assign plants from different company codes to the purchasing organization.

Company-specific purchasing

A purchasing organization is responsible for the purchasing activities of just one company code. In this case, you assign a company code to the purchasing organization. The purchasing organization may procure only for this company code. You assign only plants of the company code concerned to the purchasing organization.

Plant-specific purchasing

A purchasing organization is responsible for the purchasing activities of one plant. In this case, you assign the plant and the company code of the plant to the purchasing organization. The purchasing organization may procure for this plant only.

Reference Purchase Organization

If you wish to work with a mixture of the above organizational forms, the reference purchasing organization is of significance to you. It is possible to allow one purchasing organization to access the contracts and conditions of another - a so-called reference purchasing organization. This makes it possible for advantageous terms negotiated by one purchasing organization to also be used by other purchasing organizations.

Standard purchasing organization:

"If several purchasing organizations procure for a certain plant, you can define one of them as the standard purchasing organization for the transactions "pipeline procurement", "consignment" and "stock transfers". (Matthew, First Post).

"In source determination for stock transfers and consignment, the system automatically utilizes this standard purchasing organization. In the case of goods issues of pipeline materials, the purchasing info records of the standard purchasing organization are read."

VENDOR RATING

Vendor rating is the result of a formal vendor evaluation system. Vendors or suppliers are given standing, status, or title according to their attainment of some level of performance, such as delivery, lead time, quality, price, or some combination of variables. The motivation for the establishment of such a rating system is part of the effort of manufacturers and service firms to ensure that the desired characteristics of a purchased product or service is built in and not determined later by some after-the-fact indicator. The vendor rating may take the form of a hierarchical ranking from poor to excellent and whatever rankings the firm chooses to insert in between the two. For some firms, the vendor rating may come in the form of some sort of

award system or as some variation of certification. Much of this attention to vendor rating is a direct result of the widespread implementation of the just-in-time concept in the United States and its focus on the critical role of the buyer-supplier relationship.

Most firms want vendors that will produce all of the products and services defect-free and deliver them just in time (or as close to this ideal as reasonably possible). Some type of vehicle is needed to determine which supplying firms are capable of coming satisfactorily close to this and thus to be retained as current suppliers. One such vehicle is the vendor rating.

In order to accomplish the rating of vendors, some sort of review process must take place. The process begins with the identification of vendors who not only can supply the needed product or service but is a strategic match for the buying firm. Then important factors to be used as criteria for vendor evaluation are determined. These are usually variables that add value to the process through increased service or decreased cost. After determining which factors are critical, a method is devised that allows the vendor to be judged or rated on each individual factor.

It could be numeric rating or a Likert-scale ranking. The individual ratings can then be weighted according to importance, and pooled to arrive at an overall vendor rating. The process can be somewhat complex in that many factors can be complementary or conflicting. The process is further complicated by fact that some factors are quantitatively measured and others subjectively.

Once established, the rating system must be introduced to the supplying firm through some sort of formal education process. Once the buying firm is assured that the vendor understands what is expected and is able and willing to participate, the evaluation process can begin. The evaluation could be an ongoing process or it could occur within a predetermined time frame, such as quarterly. Of course the rating must be conveyed to the participating vendor with some firms actually publishing overall vendor standings. If problems are exposed, the vendor should formally present an action plan designed to overcome any problems that may have surfaced. Many buying firms require the vendor to show continuing improvement in predetermined critical areas.

CRITERIA FOR EVALUATION

Vendor performance is usually evaluated in the areas of pricing, quality, delivery, and service. Each area has a number of factors that some firms deem critical to successful vendor performance.

Pricing factors include the following:

- **Competitive pricing.** The prices paid should be comparable to those of vendors providing similar product and services. Quote requests should compare favorably to other vendors.
- **Price stability.** Prices should be reasonably stable over time.
- **Price accuracy.** There should be a low number of variances from purchase-order prices on invoiced received.

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- Advance notice of price changes. The vendor should provide adequate advance notice of price changes.
- Sensitive to costs. The vendor should demonstrate respect for the customer firm's bottom line and show an understanding of its needs. Possible cost savings could be suggested. The vendor should also exhibit knowledge of the market and share this insight with the buying firm.
- Billing. Are vendor invoices accurate? The average length of time to receive credit memos should be reasonable. Estimates should not vary significantly from the final invoice. Effective vendor bills are timely and easy to read and understand.

Quality factors include:

- Compliance with purchase order. The vendor should comply with terms and conditions as stated in the purchase order. Does the vendor show an understanding of the customer firm's expectations?
- Conformity to specifications. The product or service must conform to the specifications identified in the request for proposal and purchase order. Does the product perform as expected?
- Reliability. Is the rate of product failure within reasonable limits?
- Reliability of repairs. Is all repair and rework acceptable?
- Durability. Is the time until replacement is necessary reasonable?
- Support. Is quality support available from the vendor? Immediate response to and resolution of the problem is desirable.
- Warranty. The length and provisions of warranty protection offered should be reasonable. Are warranty problems resolved in a timely manner?
- State-of-the-art product/service. Does the vendor offer products and services that are consistent with the industry state-of-the-art? The vendor should consistently refresh product life by adding enhancements. It should also work with the buying firm in new product development.

Delivery factors include the following:

- Time. Does the vendor deliver products and services on time; is the actual receipt date on or close to the promised date? Does the promised date correspond to the vendor's published lead times? Also, are requests for information, proposals, and quotes swiftly answered?
- Quantity. Does the vendor deliver the correct items or services in the contracted quantity?
- Lead time. Is the average time for delivery comparable to that of other vendors for similar products and services?
- Packaging. Packaging should be sturdy, suitable, properly marked, and undamaged. Pallets should be the proper size with no overhang.

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- **Documentation.** Does the vendor furnish proper documents (packing slips, invoices, technical manual, etc.) with correct material codes and proper purchase order numbers?
- **Emergency delivery.** Does the vendor demonstrate extra effort to meet requirements when an emergency delivery is requested?

Finally, these are service factors to consider:

- **Good vendor representatives** have sincere desire to serve. Vendor reps display courteous and professional approach, and handle complaints effectively. The vendor should also provide up-to-date catalogs, price information, and technical information. Does the vendor act as the buying firm's advocate within the supplying firm?
- **Inside sales.** Inside sales should display knowledge of buying firms needs. It should also be helpful with customer inquiries involving order confirmation, shipping schedules, shipping discrepancies, and invoice errors.
- **Technical support.** Does the vendor provide technical support for maintenance, repair, and installation situations? Does it provide technical instructions, documentation, general information? Are support personnel courteous, professional, and knowledgeable? The vendor should provide training on the effective use of its products or services.
- **Emergency support.** Does the vendor provide emergency support for repair or replacement of a failed product?
- **Problem resolution.** The vendor should respond in a timely manner to resolve problems. An excellent vendor provides follow-up on status of problem correction.

A 2011 article in *Supply Management* notes that while pricing, quality, delivery, and service are suitable for supplies that are not essential to the continued success of the buying firm, a more comprehensive approach is needed for suppliers that are critical to the success of the firm's strategy or competitive advantage. For firms that fall into the latter category performance may need to be measured by the following 7 C's.

1. **Competency** - managerial, technical, administrative, and professional competence of the supplying firm.
2. **Capacity** - supplier's ability to meet physical, intellectual and financial requirements.
3. **Commitment** - supplier's willingness to commit physical, intellectual and financial resources.
4. **Control** - effective management control and information systems.
5. **Cash resources** - financial resources and stability of the supplier. Profit, ROI, ROE, asset-turnover ratio.
6. **Cost** - total acquisition cost, not just price.
7. **Consistency** - supplier's ability to exhibit quality and reliability over time.

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If two or more firms supply the same or similar products or services, a standard set of criteria can apply to the vendor's performance evaluation. However, for different types of firms or firms supplying different products or services, standardized evaluation criteria may not be valid. In this case, the buying firm will have to adjust its criteria for the individual vendor. For example, Honda of America adjusts its performance criteria to account for the impact of supplier problems on consumer satisfaction or safety. A supplier of brakes would be held to a stricter standard than a supplier of radio knobs.

AWARDS AND CERTIFICATION

Many buying firms utilize awards and certification programs to rate vendors. Attainment of certification status or an award serves as an indicator of supplier excellence. Certification and awards-program recognition represents a final step in an intense journey that involves rigorous data collection under the total-quality-management-rubric as well as multitudes of meetings with suppliers and purchasing internal customers. Serious buying firms view these programs as an integral part of their overall efforts to improve the total value of the company.

The attainment of a supplier award usually serves as an indication that the vendor has been rated as excellent. Intel awards their best suppliers the Supplier Continuous Quality Improvement Award (SCQI). Other firms may utilize a hierarchy of awards to indicate varying degrees of performance from satisfactory to excellent. DaimlerChrysler awards its best suppliers the Gold Pent star Award. Several hundred vending firms receive this award per year. However, only a handful (less than a dozen) of DaimlerChrysler's vendors is good enough to garner the Platinum Pent star Award.

For other firms, supplier certification is desirable. Supplier certification can be defined as a process for ensuring that suppliers maintain specific levels of performance in the areas of price, quality, delivery, and service. Certification implies that participating firms have reached a level of excellence that other firms were unable or unwilling to achieve. For example a quality certified firm maintains a level of quality such that customer-receiving inspection may be utilized with decreasing frequency up to the point where it is eliminated altogether. Theoretically, this will ensure that all of the supplier's products meet the customer's product specifications. In this case, the goal of supplier certification is quality at the source.

While it is uncertain whether individual firms are consistent in the manner in which they certify vendors, a quality certification would likely require that the vending firm be part of a formal education program, utilize statistical process control (SPC), and have a quality assurance plan (set written procedures).

BENEFITS

Benefits of vendor rating systems include:

- Helping minimize subjectivity in judgment and make it possible to consider all relevant criteria in assessing suppliers.
- Providing feedback from all areas in one package.

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- Facilitating better communication with vendors.
- Providing overall control of the vendor base.
- Requiring specific action to correct identified performance weaknesses.
- Establishing continuous review standards for vendors, thus ensuring continuous improvement of vendor performance.
- Building vendor partnerships, especially with suppliers having strategic links.
- Developing a performance-based culture.

Vendor ratings systems provide a process for measuring those factors that add value to the buying firm through value addition or decreased cost. The process will continually evolve and the criteria will change to meet current issues and concerns.

For example, some feel that supplier evaluation must now reflect the strategic direction of the buying company's environmental initiatives. As a result, some firms have recently developed supplier evaluation systems that place significant weight on environmental criteria. It would seem that the concept will remain valid for some time.

Stores' Systems and Procedures

Any Stores system starts with planning the need for materials. It is assumed here that the need itself has been forecast with a considerable degree of accuracy. The forecast also must be subjected to periodic review. The art of storekeeping is largely that of optimizing the use of resources to meet actual needs in an efficient manner.

Efficiency of Stores function is measured by the number of times the stocks have turned over. That is how much time material spends in the stores. The lesser time it spends the better it is. As money is a scarce resource, once it is converted into materials, then only it is useful. This is the essence of stock turnover. Stores is a very broad word that indicates a wide variety of materials stored such as chemical, metals, liquids, gases, spare parts, equipment, or finished goods, ranging from engineering components to drugs and pharmaceuticals.

Each of these items will require a specific type of storage and their handling and preservation methods will vary accordingly. There is a high degree of specialization required to store and handle these products and in many cases special storage licenses need to be obtained from the Government, e.g., the storage of petroleum products or explosive products. It is hence mandatory for Stores personnel to understand thoroughly all of these requirements and implications. The understanding of these principles is most important in the efficient practice of the art of storekeeping.

The services rendered by Stores can be arranged into four broad activities:

- To make available a balanced and uninterrupted flow of raw materials, components, tools, equipment and any other material needed to meet operational requirements
- To provide maintenance materials, spare parts and general stores as requirements

- To receive and issue finished products
- To accept and store scrap and other discarded material as they arise
- To effectively dispose of the unwanted materials

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The interesting facet of the whole situation is that Demand comes bundled while supplies unbundled. That is demand is usually from Production which will give Stores a BOM (Bill of Materials) and probably different materials (which come from different suppliers) are required at the same time. While supply comes from different suppliers from different regions which may or may not (in all possibility may not) come at the same time. Hence balancing all these is a considerably demanding job, which is required to be performed by stores personnel.

In the face of a challenging situation faced by stores personnel, one of the main responsibilities for them is to:

- Properly account for every item received in the stores
- Preserve the material till its issue from stores and
- Issue the material when demanded

To have effective control and proper accounting of materials , a professionally managed Stores has the following main functions :

- Receiving
- Custody
- Inventory Control
- Disposal

To discharge the functions effectively , a typical stores division consists of several physical structure (building) known as Receiving bays, Custody storage , Quarantine space etc

STORES RELATIONS WITH OTHER FUNCTIONS

Stores, apart from Finance function, is one that comes in contact with all the major functions of any organization or business.

In its daily working, it is closely related to Purchase function that virtually feeds it with its Purchase orders and the user departments, on the other hand, which draw materials from it on daily basis. In addition, it is the Finance function which is fed by stores much information on daily basis.

One of the major roles of Stores, in any business, is Inventory Control. This vital function of Stores, in itself, affects many functions of business by decoupling many activities and functions.

Stores serves all departments of an organization, but the highest degree of relations are between Purchase who feeds the stores, and Production whom the Stores supplies various materials.

Stores and Purchase:

The two functions of materials management, Stores and Purchase, are complementary to each other.

Apart from the close relationship that exists on a day-to-day basis in the purchase of various items of stores there are other important activities which can best be done by close cooperation between stores and purchase. These are :

- Identification i.e. coding of material
- Variety reduction
- Inventory control value analysis
- Salvaging operations etc.
- Stores sends indents to purchase based on inventory levels determined in accordance with usage and delivery lead times
- Correct specification writing, code numbers, mention of units (e.g. pounds instead of kilos) etc., are all vital in this regard
- Determination of 'lot sizes' for purchase which should suit production requirements, transport, handling and storage space
- Purchase informs stores of orders placed and stores in turn informs purchase of receipts, rejections, shortages, breakages, theft and loss, if any
- Stores should inform purchase of changing production trends, slow or non-moving stock, obsolete or surplus stock, scrap, etc.

Stores and Production:

The production or the user department happens to be the main customer of stores. In production meetings, if stores is represented, coordination can be excellent. Any change in a production schedule needs to be communicated to stores to enable prompt corrective action.

After all it is Stores that has to cater to the needs of the user departments

Stores and Sales:

The strong relationship between stores and sales exists in the marketing scenario where Sales is the chief customer of the finished goods store.

The sales department wants to ensure stocks at all times and this might be a costly philosophy in terms of inventory holdings. Close cooperation and an integrated approach can increase profitability.

Stores and Accounts:

Usually the accounts department does all the stores accounting ensuring a day-to-day working relationship.

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Stores and personnel:

Selection of the right person for stores work and an adequate training in storage, preservation and accounting techniques is vital.

ADVANTAGES AND DISADVANTAGES OF A CENTRALIZED STORE

The organization set-up of the stores depends upon the requirements, and have to be tailor-made to meet the specific needs of an organization.

There are two broad classifications of Stores:

Functional Stores and Physical Stores based on physical considerations.

Physical considerations: There can be various types of stores based on the quantity of stocks held or distance from the point of usage, like central stores sub-stores, transit stores, site store etc.

Central store:

There can be a central store serving three or four factories or several shops in a large factory or it can be a central warehouse containing finished goods. The word 'central' only denotes that it serves various units each of which may have separate sub-stores or departmental stores. Central stores also exist in multi-plant situations.

Usually for better control, Organization keeps a Central Stores which is usually responsible for all activities mentioned above for entire organization and then sends them on ,as and when basis, to other stores which are usually attached to the production capacities located at various places.

For example a hospital may have central stores with separate ones for each category of ward i.e. stores for linen, surgical instruments, drugs, and general requirements.

The stores in an airlines company may have the following sections - receipts, quarantine (pre-inspection), commercial stores, general paint and oil stores, stationary stores, raw materials stores, aircraft spares subdivided into engine spares and accessories, general, radio, instrument and maintenance.

Advantages of a Centralized Store:

1. Centralized Store can offer a wider range of goods is provided for all users than is possible in smaller stores.
2. Inventory can be minimum as material is ordered based on requirement of all other attached parties and material can be shunted to and from one store to other one attached to the Central Stores. This is especially so in the case of tools fixtures, equipment and spares.
3. Better control is possible.
4. Economies in storage is possible. Goods in bulk will occupy less space.
5. Bigger storehouses enable better and more modern handling methods (mechanical or automatic).

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6. Delivery at a single point decreases cost of delivery.
7. Receipt and inspection of goods can be more efficiently organized.
8. Opportunities of standardization are improved.
9. Stock turnover is increased and the probability of deterioration during storage is correspondingly decreased.
10. Less personnel will be required for managing. Unnecessary duplication of records takes place in decentralized Stores. For example, one may have ten different Kardex cards for one material stocked in ten places. Similarly, accounting work is multiplied.

Disadvantage of a Centralized Store:

1. Extra handling is involved and staff will be required for transportation from stores to the various production units.
2. If the system is not well organized there can be severe shortages at work places causing unnecessary interruptions in production. Inefficiency can also result in Production keeping some buffer inside the unit, which can lead to cluttering of space, and to pilferage because of the absence of security.
3. More internal documentation may become necessary
4. If a fire takes place there is a greater risk, because entire stocks can be lost bringing production to a total halt.
5. It is apparent that there can be myriad's of types of materials which are stores, depending upon the type and complexity of the industry which the Store serves. There can be small items like nuts and bolts or heavy items like steel plates, there can be gases in cylinders (like LPG or oxygen), powders, liquids, some of them dangerous like sulphuric acid, or inflammable, like petrol, and so on. The variety is almost infinite.

RESPONSIBILITIES OF A STORE

Interestingly, Stores is a function that is visible in probably any physical house. Be it a hotel, a hospital, a shop or industrial set up Stores is found every where.

Its presence every where adequately underlines the responsibility of Stores. Depending upon where it is located a Store has to burden from minor to major responsibilities.

The most common yet major responsibilities that are carried by any Stores are:

- Receipt of incoming goods
- Inspection of all receipts
- Storage and preservation
- Identification of all materials stored
- Materials handling
- Packaging

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- Issue and dispatch
- Maintenance of stock records
- Stores accounting
- Inventory control
- Stock-taking
- Receipt is the process of checking and accepting, from all sources (vendors, production units, repair units etc.), all materials and parts which are used in the organization. These include supplies for manufacturing or operating processes, plant maintenance, offices and capital installations.
- Identification is the process of systematically defining and describing all items of materials in stock. It includes the preparation of a Stores Code or Vocabulary, the adoption of materials specifications and the introduction of a degree of standardization. In certain cases, part of this work may be done by the design, planning or standards departments or sometimes the purchase department.
- Inspection involves the examination of incoming consignments for quality. Very often there is a separate Quality Control or inspection department, which undertakes this work for most, materials. Otherwise goods are inspected by Stores to ensure that the inspection procedures laid down are carried out before materials are accepted into stock.

Storage and preservation involves items to be binged and kept in storage bins and impounds; as usually indicated in the yard. The location is usually indicated in the transaction card. The storage period may vary between one day and one year or more, depending upon recoupment procedures/safety stock required, etc. storage is the physical act of storing the materials. The general rule is: "A place for everything in its place". Presentation involves the maintenance, of materials to retain their quality. Quite often, temperature, humidity, dust and other factors cause deterioration of materials.

- Materials handling involves movement and handling. This can be manual or mechanical (e.g. by use of forklifts) heavy items, dangerous or inflammable goods, and delicate merchandise have all to be handled differently.
- Packaging: Materials dispatched to customers from the finished goods store or from one store to another at different location require to be packed. Materials required packing according to their nature and this may vary from heavy wooden crates to ordinary paper cartons.
- Issue and Dispatch is the process of receiving demands, selecting the items required and handling them over to users, or dispatching them to customers.

Stock Records are the documents which record, form day to day, full particulars of individual receipts, issues and balances of materials in stock.

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Stores accounting is the process of recording details of stock movements and balances in terms of financial value. It is sometimes undertaken by accounts department, but there is much to be said for it being handled by stores. In practice, it is often found that such an arrangement saves a good deal of work and duplication. It has the added advantage of making Stores personnel responsible for providing their own financial information, which they require for the purpose of inventory control

- Inventory control is the operation of continuously arranging receipts and issues in such a way so as to ensure that stock balances in quantity and/or value are adequate to support the current rate of consumption at all times with due regard to economy. It involves the related process of provisioning, which is the means whereby instructions are given for the placing of orders to correspond with future estimated requirements. In some industrial concerns, the production control department may have a large share in provisioning; at least as far as production materials are concerned. Nevertheless this should always ultimately be the function of Stores.

Stock-taking is the process of physical verification of the quantity and condition of goods in store

A Stores manager, therefore, is responsible for carrying out the following functions:

- Receive incoming goods
- Supervise unloading of material Count, tally
- Check for damage/shortage and prepare report
- Fill Goods Inward / Day Book/ Daily Collection Register
- Complete Vendors Consignment Note (Challan)
- Arrange for inspection and complete the inspection
- Prepare Goods Receipt Note (GRN)
- Prepare Goods Rejection Memo (in case of goods rejected)
- Send goods to stores
- Send other documents to respective departments
- Ensure all storage facilities are in proper working order e.g. check for loose racks, damaged pallets etc.
- Ensure goods housekeeping (i.e. check for spillage of oils, dirty walls, obstructions).
- Ensure all materials handling equipment are in goods condition
- Check and count goods before issue
- Make entries Bin/Kardex (stock) cards promptly
- Ensure Receipts and Issues are correctly documented

- Ensure that rules and regulations relating to physical custody and preservation of stores are followed
- Ensure correct accounting of stores

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TYPES OF STORES

Depending upon the nature of business, location of action, raw material, market place etc. Stores' Layout is planned. Hence it is necessary to have a look at different types / classification of Stores:

There are basically two broad classes:

Functional Stores: It depends on the use to which the material is put - chemicals, tools, raw materials stores, etc.

Physical Stores: It depends on the size and location - Central stores, Sub-stores, Transit stores, Site stores etc.

Functional Stores can be further classified as:

Raw materials store:

This is where raw materials used in the factory are stored. Usually, this is the largest kind and the location should be such that it is situated alongside a railway, canal or river. Where the deliveries are by road, there must be adequate space for trucks to move, turn and park. If sufficient provision is not made for quick and easy loading or unloading, heavy demurrage can result.

Not all such stores need covered sheds. For example, an engineering company whose raw material is steel will store the steel plates in an open yard. Similarly, a powerhouse using coal or a fertilizer plant using sulphur will store material in the open. A refinery will store its crude-oil in tanks.

In certain cases where the raw materials may be explosive dangerous or poisonous in nature, complete segregation will be necessary.

Production Store:

Production also requires a large number of materials, generally called "consumables", - eye-shields, cutting oils, abrasives, gloves, aprons, jigs, small tools etc. A store stocking such items is called a Production Store.

General Store:

Various kinds of miscellaneous items like paints, brushes, cleaning materials, wood and spirit are kept here. In some cases where there is no Production Store, the materials mentioned in (ii) are kept in the General Store.

Tools Store:

All kinds of tools files, measuring instruments, saws, small tools like hammers, pliers, etc. or sell them as scrap. Steel scrap is usually kept separately, preferably in the open. Some metal scrap like copper can be very costly and should, therefore, be kept safely in covered stores.

Salvage Store:

Here materials rejected on the factory floor are stored either with a view to salvage them or to sell them as scrap. Steel scrap is usually kept separately, preferably in the open. Some metal scrap like copper can be very costly and should, therefore, be kept safely in covered stores.

Packing store:

Packing materials are kept here and these include wood for making crates, cardboard cartons or bottles, as in a pharmaceutical company, or empty cylinders.

Spare parts store:

These spares are usually required by Maintenance for repair or overhauling of equipment and machinery in the factory. Such a store can also have spares and components, which have been manufactured in plant or purchased from outside and meant for production. This is also called a finished parts store, semi-finished parts store or component store.

Receipt Store:

This is where goods are received from vendors or those cleared from the railway station, airport or the docks. The materials arriving here have to be retained until they are inspected, finally accepted and sent on to the respective places for storage, or directly to where they will be used.

Quarantine Store:

Here materials received from outside awaiting inspection, and this is usually a part of the receipt store. The term quarantine is used because often inspection may not be completed in a day; e.g., a lab test may be required for specific items. In such cases, these materials are placed in the Quarantine Store.

Finished Goods store:

Finished products of the company meant for dispatch to customers or for transfer to another stock point or distribution center are kept here.

Work-in-progress Store:

In many cases a particular shops produce an item in batches, e.g., 1000 units. The other shops might not be able to reach this figure or the actual quantity required might only be 200. Here rest of the 800 units in semi-finished form are kept in the WIP Store for future use. This is neither raw materials nor finished goods. It is in an intermediate state. In some instances the Spare Parts Store can also be a WIP Store.

Stationary store:

Keeps office stationary for issued to various departments of the company.

Bonded store:

This is a store of goods on which customs or excise duty has not been paid.

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Refrigerated store:

This type of store is used for storage of perishable items like fruit, meat, chemicals, medicine, vegetable, etc. it further comprises:

Chilled space store, where the temperature can be controlled between 32 F and 50 F.

Freeze space store, where the temperature can be controlled below 32 F

Flammable materials store:

This is used for the storage of highly combustible material like oil, paints, etc. this store consists of separate compartments partitioned by fire walls, which is done with a view to prevent movement of flames from one area to another in the event of a fire. These fire walls will normally have a four hour fire resistance rating. The main dependence for fire protection is placed on an automatic deluge type sprinkler system connected to an adequate water supply.

Dehumidified store:

It meets the need of materials or equipment to be stored in a moisture-free atmosphere (humidity free condition). When properly sealed and conditioned almost any type of item can be stored here efficiently.

Transit Sheds:

These are normally roofed sheds without any walls and open on four sides and are mainly intended to protect goods from sun and rain. One can find such sheds in ports, adjacent to berthed cargo ships. They are specially adapted for the items are handling of material shipped or received by sea. Here the items are handled and stored in bulk quantities. In certain cases, the Food Corporation of India stores bags of rice or wheat in such open sheds. 'Transit' signifies that storage is temporary and that the goods are to be moved out soon.

Dry Tanks:

Dry tanks are used for long term storage and are constructed entirely with steel, except for a concrete floor. Because of the size and shape of dry tanks, there is no operating aisle for materials handling equipment. There is no direct access into the tanks, which are sealed after materials are stored in them. The dry tanks can be temperature controlled and dehumidified.

Shed storage:

A shed is a roofed structure without complete side and end walls, and is used for the storage of materials that require maximum ventilation or those that do not require protection from weather. This type of building is a compromise between a yard store and a closed stores building, because it offers more protection to materials than former but less than the latter. If necessary, tarpaulins, can be used on the side for protection during the monsoon. It is built at ground level with a concrete floor.

Open Yard:

This is used for storing bulk items, which do not require specialized storage. Even though there is no protection from sun and rain, the surface of the open yard is normally leveled and is covered by sheets or steel mats.

The organization set-up of the stores will depend upon the requirements, and have to be tailor-made to meet the specific needs of an enterprise. It may also be stated here that separate buildings are not necessary for these stores. They can all be in one building in the manner described above. Therefore mentioned list is by no means complete; one can have an infinite variety. For example, one a military establishment or a very big shipping or Airlines Company can have a large number of specialized types of stores.

Physical considerations: There can be various types of stores based on the quantity of stocks held or distance from the point of usage, like central stores sub-stores, transit stores, site store etc.

Central store:

There can be a central store serving three or four factories or several shops in a large factory or it can be a central warehouse containing finished goods. The word 'central' only denotes that it serves various units each of which may have separate sub-stores or departmental stores. Central stores also exist in multi-plant situations.

One of the problems in having a central store is the handling costs involved in transferring materials to the sub-stores or shop floor. Usually, therefore, the central stores located at the point of greater usage.

One of the main control factors in the establishment of a central store is to ensure that unnecessary inventories are not built up by the sub-stores, or that matter by the sub-stores and the central stores should be considered as one.

Sub-store:

A sub-store is located at the place of usage. It can be even within the shop floor.

Departmental Store:

This serves a particular department of a factory. For example, in a textile mill there can be several departments like spinning, weaving, bleaching, printing, etc. each of which can be served by a separate store. The reason behind this is that each requires separate kinds of materials. This store then becomes a specialized store. Actually. There need be little difference between this category of store and a sub-store.

Group Stores:

In some companies it can happen that several factories belonging to the same group are all in one compound. For example the J. K. Group of Industries has several factories belonging to the same owner, which have been set up in one big industrial estate. There can be a garment factory, a chemical plant, a radio factory and a foundry all belonging to one group and located at the same place. The group stores can serve all these units.

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Site store:

This is usually at a project site containing building or construction materials like cement, steel, tools, etc.

Transit store: as its name implies, this is where goods are stored for a temporary period.

FUNCTIONS AND RESPONSIBILITIES OF STORES DEPARTMENT IN DETAIL

- Receipt of materials;
- Storage, Preservation and Safe Custody;
- Issue of materials against proper authorizations;
- Quantitative account of the above transactions;
- Disposal of obsolete / unserviceable / scrap items,
- Verification of stores;
- Other related works;

RECEIPT OF MATERIALS

Receipt of Goods in the stores will, fall into one of the following categories: -

Items received for immediate issue to the indenting Department / Project through Stores Requisition (SR). (Non-Stock Items).

Items received for storage in Stores Department for periodical issue to Groups / Sections through Stores Requisition (SR). (Stock Items).

Receipt of Dispatch Documents.

Consignment arriving at the Unit through rail / road / air / post / direct, etc will be covered by Railway Receipt / Lorry Receipt / Air Consignment Note / Postal dispatch Advice / Delivery Challan, etc. These documents are received in the Purchase Department.

Retirement of Documents from Bank:

On receipt of information from Bankers, the Account Section shall retire the documents from Bank, after verification of their authenticity, and hand over the consignment note in respect of indigenous orders as well as the Bill of Landing, etc. in respect of imported consignment to Purchase Department for clearance.

Registration of Railway Receipt / Lorry Receipt / AC Note Etc.

The Dispatch Documents, on receipt at the Purchase Department should be immediately entered in the Goods Receipt Register with all relevant details giving each entry a serial number. The authentication of the Documents will be verified with the Purchase Orders.

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Consignment Clearance Procedure.

The Purchase Department shall clear consignments daily from Railway/Road transport companies, Airlines etc. against documents after carefully checking the weight of the consignments and outward conditions of the particles. All consignments as far as possible should be cleared without any loss of time to avoid wharfage /demurrage charges. Wherever necessary, the services of a Transport Contractor/Cleaning Agent may be engaged for carrying out the clearance work. It will be the responsibility of the Purchase Department to clear all consignments and handover the materials along with all relevant details to the Stores Department.

Open Delivery and Clearance Against Indemnity Bond

In the case of damaged consignments or when it is suspected that the contents are broken/damaged/lost, "Open Delivery" should be insisted upon if applicable and/or necessary shortage/loss certificate/endorsements taken from the carriers by the Purchase Department.

In case of non-receipt of RR/LR, etc., the clearance of consignments shall be effected under an Indemnity Bond promptly.

Wharfage and Demurrage Charges

Consignments arriving by rail should be given top-priority in the matter of clearance to avoid wharfage/demurrage charges in view of the limited free period allowed by the Railways. However, in case of consignments arriving through road carriers, maximum free period as far as possible should be obtained from such parties. In cases, where wharfage/demurrage charges become due the same shall be paid and consignment cleared. Such payments are to be regulated as follows: -

- Due to reasons attributable to the supplier in sending the dispatch documents late, the demurrage charges are recoverable from the party for which action is to be initiated by the Purchase Department and intimation sent to the Finance for further action/follow up.
- Due to reasons not attributable to the supplier are to be regularized by obtaining approval of the competent authority in the Laboratory designated for this purpose.
- The delegated powers to approve Demurrage/wharfage charges will be as per DOP.

Octroi Charges

Wherever Octroi charges have been levied on the materials consigned to the Laboratory, action will be initiated by the Purchase Department to get the amount refunded as expeditiously as possible. However, if the Octroi has been levied, due to non-compliance of the terms of the Purchase Order by the suppliers, the same shall be deducted from their bill.

Handing Over of Cleared Consignment

The consignments cleared daily should be properly accounted for. The consignments cleared daily should be listed out by the clearance personnel in the Purchase

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Department in a "Handing Over Statement" (HOS) with full details and should be handed over to the Stores Department at the end of the day or latest the next working day, clearly marking the identification number on the consignments cleared against each HOS for further action by the Stores Department, and duly taking acknowledgment thereof in the prescribed column.

Clearance of Parcel, VPPs, from the Post Office

All VPPs/Post Parcels addressed to the Laboratory should only be received by Purchase Department and should be handed over to the Stores Department. The VPPs should exhibit order particulars on the outer cover so as to enable the Purchase Dept to verify the authenticity of the parcels. For this purpose a sticker giving particulars to be filled in to be used by the supplier for dispatch of goods: may be enclosed with the purchase order. Clearance of VPPs and parcels should be done without any delay after verifying the amount claimed, purchase order, etc., properly.

Clearance of Imported Consignments at Ports and Custom Duty Parcels

The Clearance of imported goods including any claim settlements shall be looked after by the Purchase Dept. At times, however, custom duty parcels are also received via local Post Office, for the Laboratory. Such parcels, however, should be cleared by the Purchase Dept through the Finance Department and handed over to the Stores Department in the same manner. Any item received directly by persons other than the Stores Department, shall give only a provisional receipt on the challan / invoice copy as below to the concerned parties, and handover the item to the Stores at the earliest:

Door Delivery of Consignments

Door delivery of materials at our premises, made against purchase orders or other valid authorization, by suppliers shall be received at the Central Stores after getting clearance from Purchase Department. Stores Department shall ensure that the consignments are safely unloaded by employing suitable material handling devices, at the nearest site where it will be required **in consultation with the indenter** and shall arrange to release the carriers' vehicles with the least delay, to avoid any detention charges. Purchase Dept shall take action for the payment of the carriers freight bills after due checking of all the required details and certifying the same. In respect of door delivery consignments, the Stores Dept may issue a provisional receipt to the carrier or the agent, by affixing a rubber stamp on the relevant delivery challan indicating the following details as relevant for the particular case:

- Received Packages in sound / damaged conditions;
- Weight / contents not checked /checked and found correct;
- These supplies received are subject to our approvals and acceptance after check of quantity, quality and proper functioning;
- This receipt is issued provisionally in token of having received the consignments and shall not be treated as a final acceptance receipt.

Sd/-

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Receipt of Goods

All materials collected/cleared and brought to the Stores and those materials directly received in the Stores shall be checked on the basis of Handing Over Statement / Invoice / Challans / Purchase order copy, etc. Such collections shall be received and stored initially in the Receipt Section. However, equipment / machinery or bulk items which are to be directly delivered to the Groups, shall be taken to the respective place by the Stores Asst to avoid double handling and necessary paper work completed thereafter without any delay.

Opening of Consignments, Preliminary checking and Maintenance of Goods Inward Register

All consignments will be opened and checked by Store Department for any visual damages and for the correctness of the quantity with reference to documents like purchase order, packing slip, delivery challans or invoice copy in the presence of Indenter. Full particulars of the supplies shall be entered in the "Goods Inward Register" and the Registration No. (Inward Serial No.) and other relevant details shall be endorsed on the receiving documents. To enable this, 2 copies of all Purchase Orders issued will be marked to the Stores Department immediately on release to suppliers by the Purchase Department. The Purchase Orders so supplied to the Stores Dept shall contain full specification of the items on procurement.

Inspection of Materials and Preparation of MRIR

After the preliminary check in respect of quantity, the Stores Department will arrange to get the materials inspected for acceptance by the concerned user Group as required. For this purpose the Store Dept will prepare the Materials- Receipt-cum-Inspection Report (MRIR) and send the last copy of the MRIR, which will form the Material Arrival Intimation to the Concerned Group. The Indenter / Inspection Team of the concerned Group shall check for the quality and other relevant particulars to satisfy that the materials supplied confirm to order specifications and can be accepted and taken to stock. In respect of general stores item for which the Stores Department is the indenting such inspection may be done by the Officer holding charge of the Stores who, will seek the help of other user Group also. In case of rejection, the inspection authority shall send an Inspection and Test Certificate to the Stores Department. If materials are accepted, the inspection, authorization and acceptance column in the MRIR shall be retransmitted to Stores Department and the Stores Dept. will formally take the material in its stock and the items issued against Stores Requisition. All rejections on inspection should be duly supported by adequate justifications. All inspection should normally be completed within three days from the date of receipt of intimation by the Groups, though in case of materials, which require qualitative test, functional test, etc., the inspection and related formalities are to be completed within seven days. During the absence of the concerned indenter, the Project leader/Principal Investigator shall authorize a person to carry - out the inspection to avoid delay. However, it must be ensured that MRIR

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complete in all respects are forwarded to Finance through purchase within 10 days from the date of receipt of materials at Stores by the Stores Assistant, and Finance shall make payments only after the approved MRIRs and payment authorization are received by them.

List of Authorized Personnel

Project leader/Principal Investigator shall provide to Stores Department a list of authorized personnel [not more than three] with their specimen signature who are authorized to purchase and receive stores for the respective Groups. Any addition / deletion to this shall be communicated to the Stores Dept promptly.

Pre-delivery Inspection

Wherever pre-delivery inspection at the suppliers' premises is called for as per the purchase order terms, the inspecting authority shall provide a copy of such inspection report to the Stores Dept. for record purposes. Similarly, where the order stipulate approval of samples before effecting full supply, such approval reports should also be sent to Purchase Dept.

Discrepancies

Discrepancies, if any, on visual checking shall be promptly reported to the suppliers by the Stores Department under intimation to indenter/ Finance /Purchase. Discrepancies are likely to be due to: -

- Wrong materials supplied;
- Shortage/excesses;
- Damaged materials; and
- Defective materials.

Discrepancies in case of imported goods shall be immediately reported to Purchase Department. In the case of indigenous supplies all discrepancies shall be clearly recorded in the file.

Claims

Discrepancies pertaining to consignment reported by Stores / Clearance, which might have been insured by the Laboratory shall be reported to the Insurance Company by the Purchase Department immediately, at any rate within the allowed time limit given by the Insurance Co. and necessary claim preferred for the same. If required, preliminary claims are to be registered with the insurance company pending filing of the final claim. Claim shall also be preferred on carriers within the prescribed time limit with Claim Bill, etc.

Transit Losses

Losses of materials not due to reasons attributable to the supplier/any Member of Society and those which can not be recovered from any source may be written off in accordance with the prescribed rules and procedures and with the approval of the Director/Executive Director, as per the delegation of the powers, by the Purchase Dept.

Rejected Materials

Materials finally rejected shall be kept by the Stores and Purchase Dept will take action as follows: -

- Intimate the supplier by the Purchase Dept with a copy to Stores.
- If a supplier solicits any assistance from the Stores for returning the said materials, the same may be extended to them at their cost.
- if there is no response from the supplier to such intimation, he may be given a final opportunity in the form of a notice to take delivery of the materials intimating therein that if the supplier does not remove the materials within the time allowed, he shall have no further claim on the materials and the same will be disposed of as deemed fit by the Laboratory.
- Such materials will be finally disposed of in the best manner possible after taking approval of the Director /Executive Director.

Acceptance of Excess Supplies

Excess supplies already received up to 5% of the ordered quantity can be accepted if in standard packing length or size, on confirmation by purchase Department. Any excess supplies other than the above may be accepted as per para 13.28 of purchase procedure and after issuance of an amendment to the order by the Purchase Department.

Delivery Beyond Specified Time Limit

In case of delivery of materials by the supplier beyond the specified time limit mentioned in the Purchase Order, materials may be accepted after obtaining necessary amendment / advice from the Purchase Dept. keeping in view the terms and conditions of the Purchase Order regarding delay in delivery of the materials as per DOP.

STORAGE / CUSTODY AND PRESERVATION.

Issue of Stock and Non-Stock Items

The materials received in the Laboratory can be broadly divided into two categories, viz.,

- (i) Stock items, and
- (ii) Non- Stock items.

Stock items are those, which are considered as general stock materials and are indented and stocked in bulk by the Stores Dept for the use of various Groups in the Laboratory. Non-Stock items include all items of non-consumable and consumable nature which are indented by various Groups / projects for their specific use. These also cover Asset items (including equipment, machinery, furniture, etc.), which are specifically ordered for projects. The stock items are received, inspected and stocked in the Stores Dept for periodical issue through Stores Requisition to the Groups. Non-stock items are received by the Stores Dept and immediately handed over to the Groups through Stores Requisition. The Stores Dept shall arrange to

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circulate a list of all general stock items to be stocked in the Stores dept to all Groups for their information twice in a year, i.e., in January and July so that such Items need not be indented by them in the normal course. When stock of any item is not available in stores Department, and at the same time, Some of the Groups need them urgently the purchase indents raised by the Group shall be certified for non-availability and or the Stores Dept will indicate whether these materials are available with other Groups before procurement action is taken through the Purchase Dept.

Budget for Stock Items.

Purchase Indent of all stock items will be made, by the Stores Dept or the Dept assigned the responsibility for the purpose, in order to avail of the benefit of quantity discounts on price for different orders and also to cut down delays in processing numerous indents. However, budget provision for purchase of stock items will be made by the respective Groups on the basis of their annual requirements. The annual requirements should also be intimated to the Stores Dept or the Dept assigned the responsibility, for consolidating the indents and for taking action for bulk purchases. The Purchase Department will finalize the rates for purchase of stock items on the basis of competitive tendering procedures for the total quantities furnished by the Stores Department.

Preservation.

Adequate precautions may be taken to avoid deterioration of materials during storage using preservatives. Proper storing methods shall be adopted and specific instructions in this regard may be issued from time to time.

Protection from Fire Hazards.

Suitable provision shall be made for protection of materials from fire hazards. Smoking inside the storage area shall be strictly prohibited. 'No smoking' board shall be displayed at prominent places. Highly inflammable articles be kept separately and properly secured.

Location.

All materials shall be stocked in a systematic way so that minimum time is spent in picking out the materials for day-to-day issues. Thus, each rack and bin in the Stores will be identified with a location number, which shall be indicated on the respective stock cards/Bin cards.

Stores Issue Timings.

In order to enable the Stores Staff to complete the day-to-day postings on the same day and in exceptional circumstances on the next morning, the issue of materials from Stores Dept shall be restricted between 0930 hrs to 1200 hrs and from 1400 hrs to 1630 hrs. However, urgent and unavoidable requirements outside the above timings could be met on special request.

Asset Items

- Asset Items are those which have a definite life, intrinsic value and separate entity. Some items, which fall under this category, are;
- Equipment, Plant and Machinery, Machine Tools, Vehicles, Office Equipment, Furniture and Fixtures (Such as Fans, Air-Conditioners, etc.)
- Non-Consumable items are those, which neither falls in the category of Asset nor consumables.

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Numbering Asset Items.

Immediately after acceptance, all Asset items shall be recorded in an Asset Register and allot a number which should be painted on it by the Stores Dept. These numbers shall be maintained by the respective Groups for easy identification on later dates.

Return of Materials to Stores.

Any materials returned to the Stores shall be returned under a Stores Return Note (SRN).

ACCOUNTING MATERIALS.

All materials, which are accepted on inspection, shall be taken on charge on appropriate stock on the basis of MRIR prepared by the Receiving Section of SD. The materials shall be accounted in the common accepted form of accounting units (metric system), such as Kgs, litres, metres, pairs, numbers etc. Only the usual quantitative accounting need be done for all transactions. However, in the case of receipt entries, unit rate shown in the order also shall be entered in the appropriate column of the stock card.

Stock Cards

For accounting of various transactions in respect of Goods received, the Stores Dept shall maintain stock card/ BIN Card.

The day-to-day posting in respect of Stores receipt/issue/transfer should be posted in the Bin Card immediately after a transaction is effected. This function will be computerized as early as possible.

The Stores Department should ensure that the rate column is duly filled in respect of all supplies received /purchase made. For this purpose, Finance Department shall provide a copy of the final payment made against each purchase order.

Each Group shall maintain as Issue Register/BIN Card for all materials received against projects. They shall also maintain an Asset Register of all Capital equipment held by them and Project leader/Principal Investigator shall be responsible for the safe custody of stores in respect of their Group.

DISPOSAL OF OBSOLETE/SURPLUS /UNSERVICEABLE/ SCRAP ITEMS.

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Surplus, Obsolete and Redundant Materials

Each Group shall have to review the materials of different nature held in their Group twice in a year, i.e., in April and September. Items, which may not be required any longer by, the Groups, should be declared as surplus with the approval of the Competent Authority. A proforma may be used for this purpose, which may be forwarded to the Stores Department for further action. Such materials will be returned to the Stores Dept under Stores Return Note with the approval of competent authority.

Utilization of the Surplus Stores

The Stores Dept shall twice in a year compile the list of surplus items in the Laboratory and explore the possibility of effective utilization of the same by various Groups in the Laboratory. For this purpose, items where issues have not taken place for over six months shall be considered as surplus unless there are reasons to treat them otherwise. Further if the items in stock are far in excess of the average issues / anticipated requirements of the Groups for a year the balance of the stock far in excess of the average requirements shall be treated as surplus even though there are issues during the year. In case there is no requirement by any Group in the Laboratory, such list of surplus items shall be disposed of by public auction/ tender after obtaining necessary approval of the Director /Executive Director.

Unserviceable Items

All Unserviceable Asset items available in the various Groups shall be listed out and proposals for declaring them as unserviceable may be made by respective Project Managers/Investigators etc., Such items shall be inspected by a "Standing Disposal Committee" to be constituted in each Lab by the Executive Director. Thereafter such proposals shall be submitted to the Competent Authority who is empowered to declare them as unserviceable and also to approve the disposal of the same. After obtaining necessary approval from the competent authority, the sanction papers in original shall be forwarded to the Stores Department. The unserviceable materials shall be returned to the Stores Dept. with the list and Stores Return Note. In respect of non-asset items, approval of the competent authority for the disposal of the same will be obtained.

Loss of Materials and Write Off

Loss of materials may be due to a variety of reasons, viz., shortage, damage, spillage, shrinkage, evaporation, theft/pilferage etc. All such cases whenever detected shall be listed out by the concerned Group who may seek sanction of the Competent Authority to write off after proper examination and in accordance with the delegation of powers. In such cases also the approval papers in original with the supporting paper shall be forwarded to the Stores Dept.

All proposal either for the purpose of declaring the item as unserviceable / surplus / obsolete / or for write off should be submitted to the competent authority through the Finance Officer / Chief Finance Officer of the Laboratory.

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Disposal of Scrap / Unserviceable Items

Suitable enclosed type scrap dumping yard shall be provided in the vicinity of Stores Dept. for the collection of scrap materials (metal cuttings, turnings, chippings bits, etc.) generated from workshop and other Groups. It is desirable to construct a pair of such bays for each type of scrap so that when one is full, fresh dumping can be made in the other. The capacity of the bays can be pre-fabricated so that as soon as the bin is full with scrap, the approximate quantity available for auction will be readily known. Scrap of Aluminum, Stainless Steel, mild steel etc, should be dumped in separate bins/lots. However the scrap of valuable materials, such as copper, brass, molybdenum, bronze, etc should be kept under safe custody. Here again, it will be advisable to keep a pair of drums for each type of scrap so that when one drum is full, it can be handed over to the scrap yard while the other drum can be used for further collection. Such scrap shall be handed over to the Stores Dept by weight under a Stores Return Note. The scrap accumulations, i.e., metal scraps, empties, etc, shall be disposed of by weight / lot/numbers as expedient half-yearly or even earlier depending upon the quantum of scrap accumulations. The Groups shall arrange to intimate the availability of scrap to the Stores Dept with relevant details sufficiently in advance for arranging necessary disposal by public auction/tender.

Empties

All empties which can be disposed of as empties such as drums, gunny bags, polythene / glass carboys, etc., shall also be accounted in a suitable Register. Other empties, which are of scrap value, may be treated as 'Scrap'.

PHYSICAL VERIFICATION OF STORES:

The physical verification of the stores shall be effected by (i) routine verification of the stores to be carried out by the custodian of the stores and (ii) periodical verification by a team nominated by the Director /Executive Director.

Routine Verification

The Stores Asst should check his stock daily covering at least 20 to 25 items or more if possible so that he covers all items in the stock at least once in six months. The idea is to have a sort of continuous stock taking throughout the year. The result of such verification should be recorded and initialed in the stock card / stock ledgers. In case of discrepancies, he shall check with SRNs / SRs / other records and reconcile the same under intimation to the higher authorities. Whenever the Stores Asst during the course of stock verification of particular item/s comes across difference in the balances of stock card/bin card, the same should be reconciled with proper recording. Besides the routine check by the custodian of the Stores, Members of the Laboratory nominated by the Director /Executive Director shall also conduct surprise checks and record their findings.

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PERIODICAL VERIFICATION

The physical verification of all stores shall be conducted periodically but at least once in every year. Such periodical physical verifications will be conducted by a team under the overall supervision of a Member nominated by the Director /Executive Director. The team shall comprise of a representative each from Finance Dept and Stores Dept and two or three Technical staff who are conversant with various equipment and materials. Physical verifications by the team shall always be made in the presence of the subordinate person responsible for the custody of the stores or of a responsible person deputed by the Project leader/Principal Investigator concerned.

Stock Verification Sheets

The stock certification shall be done on a Stock Verification Sheet.

Material to be Verified

The physical verification team shall cover the following items.

- All stock items held in stock including consumable/non-consumable/asset (if any)
- All asset items distributed to the Groups.

Discrepancies

If the physical verification reveals discrepancies, the stockholder has to reconcile these. The Stores Asst shall investigate in detail and submit his report to the Administrative Officer with a copy to Director /Executive Director making recommendation for adjustments or any other action required under the circumstances. Final adjustments in the stock card/ stock ledger shall be made only after obtaining the orders of the competent authority.

GENERAL

Purchase indents when submitted to the purchase department; the indenting Groups may ensure that such materials are not available in the stores. For this purpose purchase indents shall be countersigned by the Stores Asst indicating non-availability and / or otherwise of such items in the stores.

All cash purchases shall be done through the Purchase department after verifying its non-availability in the stores and all materials cash purchased shall be brought to the stores for accounting and completing all stores formalities. No Stationery shall be cash purchased by Project leaders/Principal Investigators. The Stores Dept shall maintain a separate Cash Purchase Register for this purpose item-wise. Issue of materials against cash purchase shall be only to the indenter directly before the bill is passed for payment.

Any member leaving the C-MET must get "Clearance Certificate" from the Stores Department before they are relieved of their duties. They shall handover the charge of any stores held by them to the next incumbent and shall return all non-consumable items issued against their names to the Stores Dept. The Clearance Certificate shall be given only by the Member holding change of the Stores.

Library Books: The committee constituted for physical verification of stores shall also carry out physical verification of scientific books, journals etc., held on the charge of Librarian.

Transfer of Charge of Stores: Whenever there is a change in the incumbency of the custodian of stores, there shall be a handing over/ taking over of the charge of stores records, keys, etc., recorded in a proper manner.

Security: Adequate provision for security of the entire stores is extremely essential. Measure taken should include, easy segregation of the storage section from other offices, only one outlet from the storage area (as far as possible) a continuous watch over the various entrances and exits and ensuring entry only of duly authorized personnel, proper closing and opening of the storage section, by duly authorized staff, dispatch of materials with a covering document from duly authorized staff, etc

Fire Protection: The Stores Dept. and in particular the storage area should be safeguarded with appropriate type, size and numbers of approved Fire Extinguishers fitted in easily approachable locations.

Updating General Stock Items: Based on the consumption pattern, frequency of issues and general demand for the various materials, many items from the non-stock category shall be brought to the general stock items. Project leader shall inform Stores Department for inclusion of such items in the general stock.

Deviations: Where deviations from the prescribed Stores Procedures are considered necessary, prior approval of the Executive Director should be obtained by furnishing sufficient justification for such deviations and the reasons thereof should be recorded in writing. All such proposals should be routed to the Director /Executive Director through the CFO/FO.

Stores Procedure as above shall be followed by the Society in respect of all the Stores received in the Stores Department of the respective Laboratory.

Disposal of Obsolete, Surplus or Unserviceable Items

Stores, which are reported to be obsolete, surplus or unserviceable, may be disposed off in accordance with the procedure laid down hereunder.

The items to be declared obsolete / surplus / unserviceable shall be examined by a Committee constituted by the Executive Director who shall make definite recommendations as to whether they are obsolete, surplus or unserviceable. The Committee should take into account the prescribed or stipulated life-period of the stores. In case, such period is not prescribed/stipulated or it is not over, the Committee should examine the conditions of stores and record suitable reasons. If an item has become obsolete /surplus / unserviceable on account of negligence, fraud or mischief on the part of any employee, the same should be clearly brought out.

Where the 'life period' has been prescribed or stipulated and is already over, it should normally be taken as enough ground for declaring the item obsolete and unserviceable. However, the condition of the item should still be thoroughly examined to see whether the item could be put to further use.

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In other cases, where the 'life period' is not over or no 'life period' has been prescribed or stipulated, the reasons for declaring the item unserviceable may be normal wear and tear, excessive use, accident, fire, flood and other natural causes, damage due to insects, rats, etc.

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An Item may be declared obsolete / surplus if it is no longer required by the Laboratory. Reasons for the same should be recorded.

In case of loss due to negligence, fraud or mischief on the part of any employee, responsibility should be fixed and losses made good.

At the time of procurement of an item the Laboratory should prescribe the 'life period' of stores in consultation with the manufacturers; which should be properly kept on record.

All stores which may be declared as obsolete, surplus, or unserviceable and ordered to be disposed of shall be disposed of by sale or otherwise under order of an authority to whom powers are delegated under DOP.

Instruction to be followed for disposal of store

The Executive Director shall constitute a Stores Disposal Committee for each Laboratory. The Committee shall be re-constituted once in two years.

Standing Disposal Committee (SDC): The Standing Disposal Committee may be constituted by the Executive Director in each lab where a Scientist of the level of Scientist 'D' and above will act as Chairman. The other members of the Committee are one Scientist, one Technical Officer, Chief Finance Officer/FO, and Administrative Officer will act as Convener to this Committee. The quorum will be 50%. In case of dissent by any member, the proceedings of the Committee will be referred to the Director/ Executive Director whose decision shall be final. The Committee shall meet periodically at least twice in a financial year as and when required.

The function of the Standing Disposal Committee will broadly include the following:

- a) It will inspect the materials that are proposed to be declared as Surplus, Obsolete, and Unserviceable etc. by the Project leader/Principal Investigators and decide whether the stores are surplus or obsolete or unserviceable as the case may be.
- b) It will decide the mode of disposal. The detailed procedure is at para 14.8.11.5.
- c) It will fix the reserve price for disposal of items and also arrange to ensure that the lifted items are as per the disposal list.

Inspection: The Committee shall examine the stores to be declared as surplus/obsolete and unserviceable taking into account the stipulated life period each item, overall condition of the items, the reasons for obsolescence etc., requirement of such items in future, negligence or mischief or frauds on the part of any individual for such loss.

Mode of Disposal : The Standing Disposal Committee (SDC) will decide one of the following modes of disposal:

- a) By transfer to other labs
- b) By public auction
- c) By limited tendering
- d) By press tender

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By transfer to other Laboratories: A list of surplus/obsolete stores only will be circulated among all labs after the SDC recommends the items as surplus or obsolete. The transfer of these stores from one lab to the other will be made on book transfer basis as per enclosed form. The Administrative Officer shall furnish the copy of approval of the Competent Authority along with copy of transfer voucher to Finance branch to make necessary adjustment in the Balance Sheet. However, the confirmation regarding adoption of the value of such assets by the receiving lab must be ensured.

By Public Auction: The lab may consider disposal by public auction if the SDC is of the opinion that this is the most suitable course of action for disposal and the chances of forming a cartel is not there. The decision of engaging a Government recognized auctioneer to conduct a public auction may also be taken by the competent authority if the value of disposal is substantial. Every bidder in public auction shall have to deposit caution money to become eligible for bidding. The SDC shall fix the amount of caution money. An EMD of 25% has to be paid by the successful firm at the fall of hammer after adjustment of the caution money. The caution money of the unsuccessful bidders shall be refunded immediately after the auction. The highest bidder shall pay the balance 75% within 5 days and the stores will be handed over to them. The SDC may attend the public auction or nominate a sub committee to attend.

By limited tendering: The SDC can recommend disposal of stores costing upto Rs.5,00,000/- by limited tendering for sale of the stores. The tender enquiry should include a condition of EMD as 10% of the quoted price in the shape of DD/BG. The EMD of unsuccessful bidders will be returned immediately in any case within 15 days from the date of opening. The Tendering Opening Committee in the presence of the bidders will open the quotations on a particular date and time. The Standing Disposal Committee should ensure fixation of reserve price after the bids have been received but before the same are opened. The time limit for the bidders for taking delivery of the goods after payment of the bid value including amount of penalties for late lifting may be decided on case to case basis by the SDC.

Press tender: The SDC can recommend disposal of stores costing more than Rs.5,00,000/- by open tendering. In this case all the procedure outlined above at 14.8.11.7. will be followed. In addition a charge of Rs.100/- to Rs.200/- depending upon the cost of disposal may be levied from the bidders towards the cost of tender document.

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Packing wood, plastics, bottles, etc., which are voluminous in nature and also hazardous i.e., flammable etc. may be disposed off directly by the Administrative Officer to local vendors. If the estimated sale value is more than Rs.5000/- then stores shall be disposed after adequate publicity without reference to the SDC whenever, the need arises on periodic basis, so as to make space available for other purposes.

Fixation of Reserve price: Once the bids have been received either by the limited tendering or by Press tendering the SDC will meet to decide the reserve price for disposal of such Stores. The reserve price shall be kept in a sealed cover and will be opened after opening of the bids to compare the bid prices with the reserve price. While fixing the reserve price the Committee shall take the overall condition of the item vis-à-vis the market price of such second hand product.

Evaluation of the offers: After the bids were opened, a comparative statement will be prepared by Stores Dept duly vetted by Finance Division. The highest bid will be compared with the reserve price. If the highest bid price is more than the reserve price, the approval of the competent authority will be taken and the items will be offered to the highest bidder. In case, the highest bid price is less than the reserve price, the SDC will once again go through the reserve price to take a decision either to recommend disposal at the highest bid price if the difference between the reserve price and highest bid price is less than 20% or to negotiate with the highest bidder to increase his bid price above the reserve price or to re-tender.

Accounting Entries: Immediately after obtaining the approval of the Director/ Executive Director to declare the items surplus/ obsolete/ unserviceable, these items will be removed from the Stock Ledgers with suitable entries and shall be entered in the Disposable Stores Register, which will be maintained in the Stores Dept. Office Memorandum containing details of item, its value and head of account etc. will be issued by the Administrative Officer conveying the approval of the Competent Authority to declare such items surplus/obsolete/unserviceable and also convey the items to be written off in the books of the Laboratory to the Finance Officer/CFO.

Based on the OM issued by the Stores Dept Officer, Finance Officer of the Laboratory shall reduce the value of assets & liabilities in the Annual Finance of the Laboratory.

Removal of the disposed off stores by the Purchaser: The delivery of the stores will be given to the highest bidder or his authorized representative only after the full payment is deposited in case or through BG/DD. On production of the receipt, the Administrative Officer will physically hand over the item(s) sold to the party and issue the Gate Pass enabling the purchaser to take out the items sold. The details of the items sold to him should be available with the out gate pass in order to facilitate security check etc. Administrative Officer shall also record disposal/ removal of the stores in the relevant columns of the Disposable Stores Register, which has to be a permanent record with the Stores.

SUBCONTRACTING

Subcontracting is a type of work contract that seeks to outsource certain types of work to other companies. This is a step down from general contracting, which is a contract overseeing a much broader project in many cases. Subcontracting is done when the general does not have the time or skills to perform certain tasks.

When a building is being constructed, subcontracting becomes a major deal. A general contractor may take care of a number of tasks, including the brick-and-mortar construction, but look to subcontractors for other types of tasks, especially things like plumbing and electrical work. These disciplines are nearly always subcontracted out.

Larger contractors may be able to handle the plumbing and electrical work as well, without subcontracting. However, these companies are rare not only because of the expertise involved, but the desire to focus primarily in one area. If a contractor has too many disciplines, the thought may be that it is not clearly focusing its efforts on quality in one particular area.

In some cases, a general contractor may only be used as the construction manager or supervisor. In that case, subcontracting accounts for all of the physical work done on the premises. The general contractor's only responsibility is to approve the contacts, keep the project within budget and inspect the work.

Subcontracting, while prevalent in the construction industry, is also used in a number of other industries. For example, with trucking companies, there may be a time when a specific type of truck needs to be used or there simply are not enough drivers to cover all the routes. In this case, a subcontractor may be called in to help. This type of subcontracting can be a permanent, as needed, situation or done simply on a one-time basis, depending on the needs of both the company and subcontractor.

Subcontracting is also important for manufacturers making a number of products from complex components. Computer manufacturers and automobile manufacturers often use subcontractors to supply parts. In an automobile, the engine may come from one company, and the transmission from another. They are then put together in a complete package at the manufacturing facility.

Subcontracting offers a number of advantages. First, it allows work on more than one phase of the project to be done at once, often leading to a quicker completion. Second, because subcontractors already have the expertise and equipment to provide the service, it is often much cheaper for them to do the work than a general contractor who may not have that special expertise. Finally, the subcontractor is usually able to work with a general contractor on more than one project, thus creating a savings for both in the long run as a relationship is formed.

SUBCONTRACTOR AGREEMENT

A subcontractor agreement is an agreement which specifies the terms of a relationship between a contractor and subcontractor, including the type of work the subcontractor is being hired to perform. Some contractors may use generic legal forms which can be filled in with details for each subcontractor while others may prefer to work with

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agreements clearly delineate the expectations and rights of both parties to the contract.

When people hire a contractor for a project, this original contractor is known as the main or prime contractor. The responsibility for the work ultimately lies on the prime contractor, but the contractor can opt to hire subcontractors to perform part of the work. This can include people with special skills who can perform tasks better than the prime contractor along with people who may work more cheaply or quickly than the prime contractor is able to do. For each of these subcontractors, a subcontractor agreement is needed.

The subcontractor agreement describes the type of work someone is being hired for, the specifications and standards which must be met when the work is performed, and the expected time frame for the project. The agreement can get extremely detailed; for example, it can specify paint brands and colors for a painting job, or the type of wiring used for an electrical wiring job. Having all of this information clearly recorded can be critical in the event of a dispute about the work, as one party or the other can use the subcontractor agreement as supporting evidence for a claim.

In the agreement, specifications about compensation are also provided. This may be on an hourly basis or on a stipend, depending on the type of work. Behavior standards may also be covered in the contract and the contract can also describe people who will be working with the subcontractor. When a roofer is hired to put a roof on a new house, for example, both the roofer and the roofing crew are covered in the subcontractor agreement.

Contractors like to create some protections for them since they are liable for work performed by subcontractors. In turn, subcontractors also need some legal protections to ensure that they are compensated for their work, that their tools will be protected on the work site, and so forth. The subcontractor agreement creates a legal relationship between these parties and also provides people with legal options in the event of a dispute.

Selection criteria for sub contractors

One of the most important phases in the business is the bidding process. During the bidding process, selecting the most appropriate sub-contractors (SCs) for the relevant sub-works is highly critical for the overall project performance. In order to select the most appropriate SCs for the project and prepare the most realistic and accurate bid proposal, general contractors (GCs) have to know all financial, technical and general information about these SCs. Within this context, GCs should consider several factors in the selection process. These factors may include the quality of production, efficiency, employment of qualified members, reputation of the company, accessibility to the company, completion of the work on time etc.

FACTORS AFFECTING SUB CONTRACTORS RATE FIXING

1. Experience of the sub contractor

2. Nature of job
3. Health and safety standards
4. Skillfulness
5. Image of the company
6. Industry standards
7. Time constraints

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ECONOMIC ORDER QUANTITY MODEL

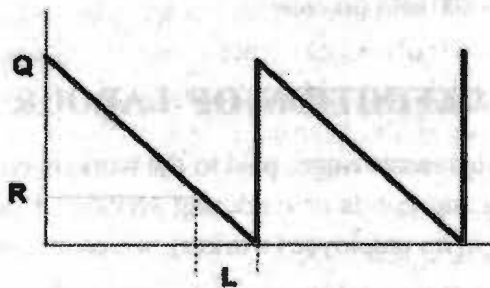
The economic order quantity (EOQ) is the order quantity that minimizes total holding and ordering costs for the year. Even if all the assumptions don't hold exactly, the EOQ gives us a good indication of whether or not current order quantities are reasonable.

WHAT IS THE EOQ MODEL?

- Cost Minimizing "Q"
- Assumptions:
 - Relatively uniform & known demand rate
 - Fixed item cost
 - Fixed ordering and holding cost
 - Constant lead time

(Of course, these assumptions don't always hold, but the model is pretty robust in practice.)

WHAT WOULD HOLDING AND ORDERING COSTS LOOK LIKE FOR THE YEARS?



A = Demand for the year

C_p = Cost to place a single order

C_h = Cost to hold one unit inventory for a year

TOTAL RELEVANT* COST (TRC)

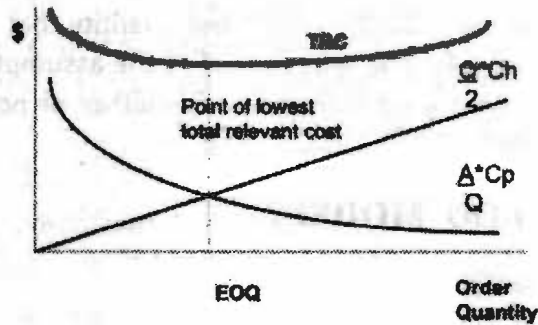
Yearly Holding Cost + Yearly Ordering Cost

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$$\frac{Q}{2} * C_h + \frac{A}{Q} * C_o$$

* "Relevant" because they are affected by the order quantity Q

ECONOMIC ORDER QUANTITY (EOQ)



EOQ FORMULA

$$\sqrt{\frac{2 * A * C_p}{C_h}}$$

SAME PROBLEM

Pam runs a mail-order business for gym equipment. Annual demand for the TricoFlexers is 16,000. The annual holding cost per unit is \$2.50 and the cost to place an order is \$50. What is the economic order quantity?

$$\sqrt{\frac{2 * 16,000 * \$50}{\$2.50}} = 800 \text{ units per order}$$

MEANING AND DEFINITION OF LABOUR COST

The term "labour cost" represents wages paid to the workers employed in business organizations for producing goods or rendering services. It also represents the various payments made to an employee (worker), which are as follows:

1. Immediate monetary benefits:
 1. Basic wages
 2. Dearness allowance (DA)
 3. Production bonus

2. Deferred monetary benefits:
 1. Employer's contribution to Provident Fund (PF)
 2. Employer's contribution to Employees' State Insurance Corporation (ESIC)
3. Retirement benefit like gratuity
4. Profit bonus
3. Fringe benefits:

Free or subsidized food, housing, transport to office, medical facilities, canteen, recreational activities and the like. Fringe benefits categorized under 'c' are generally treated as manufacturing overheads. The labour cost may be classified into:

Direct labour costs and

Indirect labour costs

ACCOUNTING OF LABOUR COST

The payments made to labour have to be properly accounted for as it constitutes a significant portion of the total cost. Sufficient care to be taken from the stage of recruitment till they leave the firms. Proper care of labour will reduce the cost of production. Hence, the labour cost has to be controlled effectively for which the following departments will assist the task. They are:

1. Personnel department
2. Time-keeping department
3. Engineering and work-study department
4. Payroll department
5. Cost Accounting department

TYPES OF LABOR COSTS

Like the labor, labor costs are of two types such as follows

1. Direct Labor Cost

Direct labor cost is the amount spent by the factory for those workers involved directly in the manufacturing process. It can be measured conveniently and accurately on per unit of output basis. Direct labor cost can be identified and allocated to the specific job or process or product. It forms a part of the prime cost. The examples of direct labor costs are the payments made to the workers engaged in making table, printing a book and constructing a dam etc.

2. Indirect Labor Cost

Indirect labor cost is the amount spent by the factory for those workers who are not directly engaged in the production process. Indirect labor cost refers

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Check Your Progress:

1. Define Purchasing?
2. What is Vendor rating?
3. What are stores?
4. What is Sub contracting?

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to the expenses incurred in remunerating such workers who assist the direct labor to complete the manufacturing processes. It can not be identified and measured accurately on per unit of output basis. It is incurred for the benefits of a number of cost centers. It forms a part of the overhead costs. Payment made to the sweepers, watchmen, cleaners, supervisors and accounting personnel are the examples of indirect labor cost.

WAGES AND INCENTIVES

The Methods of Wage Payment Under Incentive Plans. (Cost Accounting)

There are different methods of wage payment under incentive plans. They are as follows:

Taylor's differential piece rate system: This system was introduced by Taylor, the father of scientific management. This system introduced to penalize a slow worker by paying him a low piece rate for low production and to reward an efficient worker by giving him a higher piece rate for a higher production.

Thus if a worker completes the work within or less than the standard time, he is paid a higher piece rate and if he does not complete the work within the standard time, he is given a lower piece rate.

Merricks multiple piece rate: Under this method, three piece rates are applied for workers with different levels of performance. Wages are paid at ordinary piece rate to those workers whose performance is less than 83% of the standard out put. 110% piece rate is given to workers whose performance is between 83% and 100% of standard. 120% of ordinary piece rate is given to those workers who produce more than 100% of the standard output.

Gants's task and bonus plan: This plan is based on careful time and motion study. A standard time is fixed for doing a particular job, worker's actual performance is compared with the standard time and his efficiency is determined. If a worker takes more time then the standard time to complete the job (Below 100%) he is given wages for the time taken by him and if a worker takes the standard time to perform job (100% efficiency), he is given wages for the standard time and bonus of 20% of wages earned. If the worker take less time than the standard time his efficiency is more than 100% and he is given wages for the actual time and bonus at the rate of 20%.

Halsey premium plan: Under this method standard time is fixed for the job and worker is given wages for the actual time taken to complete the job at the agreed rate per hour plus a bonus to one half on the wages of the time saved.

$$\text{Total wages} = T \times R + \% (S - T) R$$

Where, T = actual time, R = Rate per hour, S = Standard time, % = 50% otherwise mentioned in the question.

Rowan premium plan: Under this method, hours is a fixed percentages of wages of time saved and worker is given a guaranteed wage rate for the time taken to finish the job.

CHAPTER SUMMARY

Purchasing refers to a business or organization attempting for acquiring goods or services to accomplish the goals of the enterprise. Though there are several organizations that attempt to set standards in the purchasing process, processes can vary greatly between organizations. Typically the word “purchasing” is not used interchangeably with the word “procurement”, since procurement typically includes Expediting, Supplier Quality, and Traffic and Logistics (T&L) in addition to Purchasing.

Purchasing managers/directors, and procurement managers/directors guide the organization’s acquisition procedures and standards. Most organizations use a three-way check as the foundation of their purchasing programs. This involves three departments in the organization completing separate parts of the acquisition process. The three departments do not all report to the same senior manager to prevent unethical practices and lend credibility to the process. These departments can be purchasing, receiving; and accounts payable or engineering, purchasing and accounts payable; or a plant manager, purchasing and accounts payable. Combinations can vary significantly, but a purchasing department and accounts payable are usually two of the three departments involved.

A cost-effective and efficient **Store Management System** is very critical to ensure smooth running of your business. Store management systems need to be flexible and secure to deliver the right customer service. These systems must be driven by access to real-time customer information. Only then can marketers deliver personalized offers and services that are up to the minute and targeted to each individual.

ANSWERS TO CHECK YOUR PROGRESS

1. Purchasing is an important function of materials management. In any industry purchase means buying of equipments, materials, tools, parts etc. required for industry.
2. Vendor rating is the result of a formal vendor evaluation system. Vendors or suppliers are given standing, status, or title according to their attainment of some level of performance, such as delivery, lead time, quality, price, or some combination of variables.
3. Stores are the areas in the production department where materials are stored.
4. Subcontracting is a type of work contract that seeks to outsource certain types of work to other companies.

CASE

TNT Fashion Logistics has doubled sortation capacity at its facility at Bergen op Zoom, The Netherlands, by installing an exact copy of its existing SDI Flexible Sortation Unit right above it, on a 5.5 meter high mezzanine.

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TNT now has the flexibility to release any type of carton from any conveyor lane into either sorter. The productivity improvements from this space saving solution will produce a payback in less than 18 months.

Both machines from the SDI Group sort single and or pre-packed single garments. This now gives TNT 56,000 carriers per hour and 440 drops in total.

“Although we do not need this capacity for three years, TNT is investing heavily and early because it is vital to have capacity on hand for when the volatile retail market needs it,” said Terry Norman, development director at TNT.

“We also wanted to minimise costs. This meant optimizing the cube of the building rather than just its 320,000 sq ft footprint.”

TEST YOURSELF

- 1) Define the term ‘Purchasing’. What are the objectives of Purchasing?
- 2) Explain various functions of Purchasing Department.
- 3) What are the parameters of Purchasing?
- 4) Explain the procedure of Purchasing.
- 5) What are the methods for evaluating the performance of past suppliers?
- 6) Describe some important purchasing systems.
- 7) Write a short note on Purchasing Organization.
- 8) Explain stores system and procedures.
- 9) What is the process of disposing of wastes?
- 10) What are the responsibilities of a stores department?

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Overheads Classification and Financial Costing/Analysis

The Unit Include:

- Overhead costs
- Classification of overheads
- Allocation of overheads
- Primary distribution of overheads
- Secondary distribution of overheads
- Reconciliation
- Service costing
- Financial analysis
- Parties interested
- Ratio analysis
- Types of ratios
- Funds flow statement
- Cash flow statement
- Objective of cash flow statements:
- Cost-volume-profit (CVP) analysis
- Contribution Margin Ratio:
- Break Even Analysis:
- Financial Forecasting
- Investment & Portfolio Strategies
- Portfolio investment process
- Corporate Investment & Portfolio
- CASE
- Chapter summary
- Test yourself

Learning Objectives:

After going through this chapter, you should be able to:

- Define overhead classification
- Describe the importance of classification.
- Discuss various parties interested in financial analysis.
- Understand strategies for portfolio management.

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The aggregate of indirect material, indirect labour and indirect expenses is called overhead. These are the costs that cannot be directly allocated to a product or a service. Therefore, these costs have to be shared among various products or services. These overheads are shared among different cost centres and units that use the resources of the organization.

OVERHEAD COSTS

Besides materials, direct labour and chargeable expenses, an organization incurs overhead costs. These are the expenses expended for the business as a whole and cannot be attributed to any single department. Therefore, it has become mandatory that these expenses are treated in some sensible manner.

CLASSIFICATION OF OVERHEADS

Overhead charges can be classified in many ways. But the following are the important bases of segregation or classification:

1. Functional classification
2. Element-wise classification
3. Behaviour-wise classification

Element-wise classification

Classification of overheads is also done according to the nature and source of expenditure. This classification results from the definition of the overhead concerned. The classification of the total overhead is done element-wise into the following groups:

1. Indirect material
2. Indirect labour
3. Indirect expenses

There are various types of expenses that fall under the categories of indirect material, indirect labour costs and indirect expenses. Some examples of indirect material are consumable stores, fuel and gas. Wages to indirect workers and salaries of foremen and works managers come under indirect labour costs, whereas expenses like insurance, rent and depreciation come under indirect expenses.

Behaviour-wise classification

This classification is made on the basis of the behaviour or nature of overhead costs. The nature of expenses is such that some of them change with the level of activity in the enterprise, while others remain constant. This leads to the fixed, variable and semi-variable categories of overheads such that

$\text{Total cost} = \text{fixed cost} + \text{variable cost} + \text{semi-variable cost}$

Fixed overhead costs represent costs that are unaffected by variations in the volume of output. These are expenses that must be met regardless of the quantity of production. Managing director's salary is an example, as also is the interest paid on loans, rent, rates, audit fees, etc. These do not vary with variation in the volume of production. But this is not true at all times. After a certain level of activity, fixed costs start to rise, although definitely not in direct proportion with the volume of output.

ALLOCATION OF OVERHEADS

It is a process of charging the full amount of cost to a cost centre or cost unit. The allocation can be done only when the cost definitely relates to a particular cost centre. Cost allocation is possible when we can identify a cost as specifically attributable to a particular cost centre; for example, the salary of the manager of the packing department can be allocated to the packing department cost centre. It is not necessary to share a salary cost over several different cost centres.

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PRIMARY DISTRIBUTION OF OVERHEADS

It is the process of allocating and apportioning costs on a suitable basis to all departments or cost centres. Primary distribution is done without any distinction between production and service departments. It is an overhead apportionment process by which common expenses are distributed among the user departments. The apportionment is done on a suitable basis. Appropriate bases for the distribution of common expenses are given in Table 7.3.

Table 7.3 Appropriate Bases for the Distribution of Common Expense

Cost items	Apportionment bases
1. Repairs and maintenance of buildings	Floor space
2. Lighting	Watts allotted or sub-meter reading
3. Water	Volume consumed
4. Telephone	Number of calls

SECONDARY DISTRIBUTION OF OVERHEADS

It is a process of redistribution of service departments' costs to production departments. Secondary distribution is also known as reapportionment or redistribution.

ILLUSTRATIONS—BASES FOR APPORTIONMENT

Illustration 1

Indicate the basis you would adopt for apportioning the following items of overhead expenses to different departments:

- a. Factory rent
- b. Factory lighting
- c. Power
- d. Depreciation of plant and machinery
- e. Insurance of plant and machinery, and fire insurance of stock
- f. Welfare expenses
- g. Material-handling charges
- h. Indirect material
- i. Indirect wages
- j. Supervision

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RECONCILIATION

The accounting procedure adopted in financial accounts differs from those adopted in cost accounts (for example, actual amounts are considered in financial accounts, whereas in cost accounts, estimated amounts are considered, stock is valued at market value or book value whichever is less in financial but in cost accounts stock is always valued at book value, etc.). Due to the difference in the procedures the profit disclosed by these accounts will differ. Therefore, it becomes necessary to reconcile these two accounts and find out the reasons for the difference.

REASONS FOR DISAGREEMENT IN PROFIT

i. **Items shown only in financial accounts:** There are a number of items included only in financial accounts but not in cost accounts. These may be items of income or items of expenditure. Items of expenditure decrease the profit and items of income increase the profit. For example,

- loss on sale of assets
- loss on investments
- taxes on income
- dividend paid.

ii. **Items shown only in cost accounts:** There are certain items, which are included only in cost accounts and not in financial accounts. These items are not shown in financial accounts because the amount is not actually spent or paid.

For example,

- interest on own premises
- interest on own capital
- salary to proprietor.

iii. **Method of stock valuation:** In financial accounts, stock is valued on the basis of its cost or market value whichever is less. In cost accounts, stock is valued

iv. at its cost value.

SERVICE COSTING

It is a method of ascertaining costs of providing or operating a service. This method of costing is applied by those undertakings, which provide services rather than production of commodities. The emphasis under operating costing is on the ascertainment of cost of services rather than on the cost of manufacturing a product. This costing method is usually made use of by transport companies, gas and water works departments, electricity supply companies, canteens, hospitals, theatres and schools.

Operation costing is an advanced form of job-order and process costing. Operation costing uses the methods that are found in either process or job-order costing. Service costing is the cost of providing a service. In other words, service costing is a method of costing applied to determine the cost of rendering service. It is adopted by those

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businesses, which operate a service rather than produce goods. Service is their final product and this service is sold to consumers. This service may be used within the enterprise as in the case of canteen boiler houses and so on; or may be rendered to the public as in state transport, hospitals, electricity and so on. Service provided within the organization is known as internal service

When is operation costing appropriate?

Operation costing is appropriate in businesses that have products that are very similar, yet differentiated in some form from each other. This difference can be in the finishing or in the actual functionality of the product.

For computing the operating cost, it is necessary to decide first, about the unit for which the cost is to be computed.

The cost units usually used in the following service undertakings are as below:

Transport service	Passenger kilometre, quintal kilometre, or tonne-kilometre
Supply service	Kilowatt-hour, cubic metre, per kilogram, per litre
Hospital	Patient per day, room per day or per bed, per operation, etc.
Canteen	Per item, per meal, etc.
Cinema	Per ticket.

FINANCIAL ANALYSIS

We know business is mainly concerned with the financial activities. In order to ascertain the financial status of the business every enterprise has to prepare certain statements, known as financial statements. Financial statements are mainly prepared for decision making purposes. But the information as is provided in the financial statements is not adequately helpful in drawing a meaningful conclusion. Thus, an effective analysis and interpretation of financial statements is required.

Analysis means establishing a meaningful relationship between various items of the two financial statements with each other in such a way that a conclusion is drawn. By financial statements we mean two statements:

- (i) Profit and loss Account or Income Statement
- (ii) Balance Sheet or Position Statement

These are prepared at the end of a given period of time. They are the indicators of profitability and financial soundness of the business concern. The term financial analysis is also known as analysis and interpretation of financial statements. It refers to the establishing meaningful relationship between various items of the two financial statements i.e. Income statement and position statement. It determines financial strength and weaknesses of the firm. Analysis of financial statements is an attempt to assess the efficiency and performance of an enterprise. Thus, the analysis and interpretation of financial statements is very essential to measure the efficiency, profitability, financial soundness and future prospects of the business units.

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Financial analysis serves the following purposes:

Measuring the profitability

The main objective of a business is to earn a satisfactory return on the funds invested in it. Financial analysis helps in ascertaining whether adequate profits are being earned on the capital invested in the business or not. It also helps in knowing the capacity to pay the interest and dividend.

Indicating the trend of Achievements

Financial statements of the previous years can be compared and the trend regarding various expenses, purchases, sales, gross profits and net profit etc. can be ascertained. Value of assets and liabilities can be compared and the future prospects of the business can be envisaged.

Assessing the growth potential of the business

The trend and other analysis of the business provide sufficient information indicating the growth potential of the business.

Comparative position in relation to other firms

The purpose of financial statements analysis is to help the management to make a comparative study of the profitability of various firms engaged in similar businesses. Such comparison also helps the management to study the position of their firm in respect of sales, expenses, profitability and utilizing capital, etc.

Assess overall financial strength

The purpose of financial analysis is to assess the financial strength of the business. Analysis also helps in taking decisions, whether funds required for the purchase of new machines and equipments are provided from internal sources of the business or not.

Assess solvency of the firm

The different tools of an analysis tell us whether the firm has sufficient funds to meet its short term and long term liabilities or not.

PARTIES INTERESTED

Analysis of financial statements has become very significant due to widespread interest of various parties in the financial results of a business unit. The various parties interested in the analysis of financial statements are:

- (i) **Investors:** Shareholders or proprietors of the business are interested in the well being of the business. They like to know the earning capacity of the business and its prospects of future growth.
- (ii) **Management:** The management is interested in the financial position and performance of the enterprise as a whole and of its various divisions. It helps them in preparing budgets and assessing the performance of various departmental heads.
- (iii) **Trade unions:** They are interested in financial statements for negotiating the wages or salaries or bonus agreement with the management.

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- (iv) **Lenders:** Lenders to the business like debenture holders, suppliers of loans and lease are interested to know short term as well as long term solvency position of the entity.
- (v) **Suppliers and trade creditors:** The suppliers and other creditors are interested to know about the solvency of the business i.e. the ability of the company to meet the debts as and when they fall due.
- (vi) **Tax authorities:** Tax authorities are interested in financial statements for determining the tax liability.
- (vii) **Researchers:** They are interested in financial statements in undertaking research work in business affairs and practices.
- (viii) **Employees:** They are interested to know the growth of profit. As a result of which they can demand better remuneration and congenial working environment.
- (ix) **Government and their agencies:** Government and their agencies need financial information to regulate the activities of the enterprises/ industries and determine taxation policy. They suggest measures to formulate policies and regulations.
- (x) **Stock exchange:** The stock exchange members take interest in financial statements for the purpose of analysis because they provide useful financial information about companies. Thus, we find that different parties have interest in financial statements for different reasons.

Nature of Financial Analysis

The nature of financial analysis can be understood from the following points:

Accounting Conventions- There are some accounting conventions which are followed while preparing financial statements.

Postulates- The accountant makes certain assumptions while preparing accounting records. For Example- Assets are shown on going concern basis.

Recorded Facts- The term recorded facts refers to the data taken out from the accounting records. The original or historical costs are the basis of recording various facts.

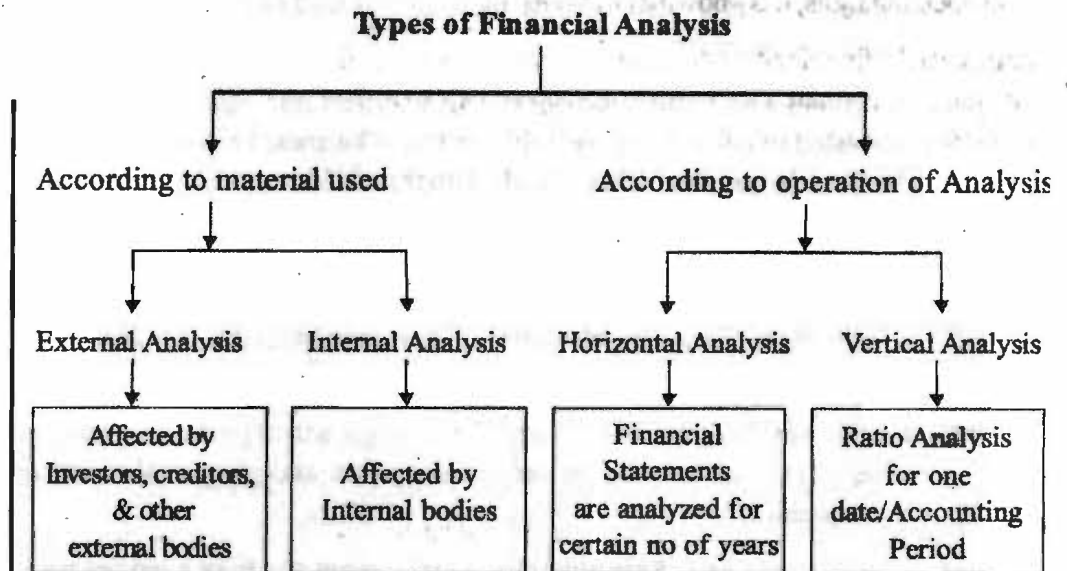
Types of Financial Analysis

The financial analysis is made on the following basis:

- a) On the basis of material used for the same.
 - External Analysis
 - Internal Analysis
- b) On the basis of operation of the analysis.
 - Horizontal Analysis
 - Vertical Analysis

Please go through the following diagram to understand the above classification

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Limitations of Financial Analysis:

There are some of the limiting factors of this analysis we must keep in mind:

- * Past financial performance, good or bad, is not necessarily a good predictor of what will happen with a customer in the future.
- * The more out-of-date a customer's financial statements are, the less value they are to the credit department.
- * Without the notes to the financial statements, credit managers cannot get a clear picture of the scope of the credit risk they are considering.
- * Unless the customer financial statements are audited, there is no assurance they conform to generally accepted accounting principles. As a result, the statements may be misleading or even completely fraudulent.
- * To see the big picture, it is necessary to have at least three years of financial statements for comparison. Trends will only become apparent through comparative analysis.

In performing liquidity analysis, most credit managers use the current and/or quick ratio. The problem is that these two ratios only provide an estimate of a customer's liquidity - they are not accurate enough to be used to predict whether or not a customer is capable of paying trade creditors and your company in particular - on time

Now we will go through the following types of Analysis:

- Ratio Analysis
- Fund Flow & Cash Flow Analysis
- Cost Volume Profit Analysis

RATIO ANALYSIS

The term "accounting ratios" is used to describe significant relationship between figures shown on a balance sheet, in a profit and loss account, in a budgetary control system or in any other part of accounting organization. Accounting ratios thus shows

the relationship between accounting data. When these ratios are used for the purpose of financial analysis, it is known as Ratio Analysis.

Ratios can be found out by dividing one number by another number. Ratios show how one number is related to another. It may be expressed in the form of co-efficient, percentage, proportion, or rate. For example the current assets and current liabilities of a business on a particular date are \$200,000 and \$100,000 respectively. The ratio of current assets and current liabilities could be expressed as 2 (i.e. $200,000 / 100,000$) or 200 percent or it can be expressed as 2:1 i.e., the current assets are two times the current liabilities. Ratio sometimes is expressed in the form of rate. For instance, the ratio between two numerical facts, usually over a period of time, e.g. stock turnover is three times a year.

Advantages of Ratios Analysis:

Ratio analysis is an important and very old technique of financial analysis. The following are some of the advantages / Benefits of ratio analysis:

- 1. Simplifies financial statements:** It simplifies the detailing of financial statements. Ratios tell the whole story of changes in the financial condition of the business.
- 2. Facilitates inter-firm comparison:** It provides data for inter-firm comparison. Ratios highlight the factors associated with successful and unsuccessful firm. They also reveal strong firms and weak firms, overvalued and undervalued firms.
- 3. Helps in planning:** It helps in planning and forecasting. Ratios can assist management, in its basic functions of forecasting, Planning, co-ordination, control and communications.
- 4. Makes inter-firm comparison possible:** Ratios analysis also makes possible comparison of the performance of different divisions of the firm. The ratios are helpful in deciding about their efficiency or otherwise in the past and likely performance in the future.
- 5. Help in investment decisions:** It helps in investment decisions in the case of investors and lending decisions in the case of bankers etc.

Limitations of Ratios Analysis:

The ratios analysis is one of the most powerful tools of financial management. Though ratios are simple to calculate and easy to understand, they suffer from serious limitations.

- 1. Limitations of financial statements:** Ratios are based only on the information which has been recorded in the financial statements. Financial statements themselves are subject to several limitations. Thus ratios derived, there from, are also subject to those limitations. For example, non-financial changes though important for the business are not relevant by the financial statements. Financial statements are affected to a very great extent by accounting conventions and concepts. Personal judgment plays a great part in determining the figures for financial statements.

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2. **Comparative study required:** Ratios are useful in judging the efficiency of the business only when they are compared with past results of the business. However, such a comparison only provide glimpse of the past performance and forecasts for future may not prove correct since several other factors like market conditions, management policies, etc. may affect the future operations.
3. **Ratios alone are not adequate:** Ratios are only indicators, they cannot be taken as final regarding good or bad financial position of the business. Other things have also to be seen.
4. **Problems of price level changes:** A change in price level can affect the validity of ratios calculated for different time periods. In such a case the ratio analysis may not clearly indicate the trend in solvency and profitability of the company. The financial statements, therefore, be adjusted keeping in view the price level changes if a meaningful comparison is to be made through accounting ratios.
5. **Lack of adequate standard:** No fixed standard can be laid down for ideal ratios. There are no well accepted standards or rule of thumb for all ratios which can be accepted as norm. It renders interpretation of the ratios difficult.
6. **Limited use of single ratios:** A single ratio, usually, does not convey much of a sense. To make a better interpretation, a number of ratios have to be calculated which is likely to confuse the analyst than help him in making any good decision.
7. **Personal bias:** Ratios are only means of financial analysis and not an end in itself. Ratios have to interpret and different people may interpret the same ratio in different way.
8. **Incomparable:** Not only industries differ in their nature, but also the firms of the similar business widely differ in their size and accounting procedures etc. It makes comparison of ratios difficult and misleading.

TYPES OF RATIOS

(1) **Liquidity Ratios-** These Ratios measure the firm position to meet its current liabilities. Following ratios come under this category:

- **Current Ratio-** It reflects the solvency of the firm.

Current Ratio = $\frac{\text{Current Assets}}{\text{Current liabilities}}$.

Higher the ratio will be, greater the safety for the creditors & vice versa. Ideal Current Ratio is 2:1.

- **Liquid Ratio/Quick Ratio/Acid Test Ratio-** The two components of liquid ratio (acid test ratio or quick ratio) are liquid assets and liquid liabilities. Liquid assets normally include cash, bank, sundry debtors, bills receivable and marketable securities or temporary investments. Similarly, Liquid liabilities means current liabilities i.e., sundry creditors, bills payable, outstanding expenses, short term advances, income tax payable, dividends payable, and bank overdraft (only if payable on demand).

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Liquid Ratio = Liquid Assets / Current Liabilities

Liquid ratio is more rigorous test of liquidity than the current ratio because it eliminates inventories and prepaid expenses as a part of current assets. Usually a high liquid ratio is an indication that the firm is liquid and has the ability to meet its current or liquid liabilities in time and on the other hand a low liquidity ratio represents that the firm's liquidity position is not good. As a convention, generally, a quick ratio of "one to one" (1:1) is considered to be satisfactory.

- Absolute Liquid Ratio/Cash Ratio = $\frac{\text{Cash} + \text{Bank} + \text{Short term Sec}}{\text{Current Liabilities}}$. Ideal Ratio is 1:2

(2) Solvency Ratios-

- **Debt-to-Equity ratio** indicates the relationship between the external equities or outsiders funds and the internal equities or shareholders funds.

Debt Equity Ratio = $\frac{\text{External Equities}}{\text{Internal Equities Or [Outsiders funds / Shareholders funds]}}$

As a long term financial ratio it may be calculated as follows:

Total Long Term Debts / Total Long Term Funds Or Total Long Term Debts / Shareholders Funds

The outsiders' funds include all debts / liabilities to outsiders, whether long term or short term or whether in the form of debentures, bonds, mortgages or bills. The shareholders funds consist of equity share capital, preference share capital, capital reserves, revenue reserves, and reserves representing accumulated profits and surpluses like reserves for contingencies, sinking funds, etc. The accumulated losses and deferred expenses, if any, should be deducted from the total to find out shareholder's funds. Debt to equity ratio indicates the proportionate claims of owners and the outsiders against the firm's assets. The purpose is to get an idea of the cushion available to outsiders on the liquidation of the firm. A ratio of 1:1 is usually considered to be satisfactory ratio although there cannot be rule of thumb or standard norm for all types of businesses.

- **Proprietary Ratio or Equity Ratio:**

This is a variant of the debt-to-equity ratio. It is also known as equity ratio or net worth to total assets ratio.

Proprietary or Equity Ratio = $\frac{\text{Shareholders funds}}{\text{Total Assets}}$

- **Fixed Assets to Proprietor's Fund Ratio:**

Fixed assets to proprietor's fund ratio establish the relationship between fixed assets and shareholders' funds. The ratio of fixed assets to net worth indicates the extent to which shareholder's funds are sunk into the fixed assets. Generally, the purchase of fixed assets should be financed by shareholder's equity including reserves, surpluses and retained earnings. If the ratio is less than 100%, it implies that owners' funds are more than fixed assets and a part of the working capital is provided by the shareholders. When the ratio is more than the 100%, it implies that owners' funds are not sufficient to finance the fixed assets and the firm has to depend upon outsiders to finance the fixed assets. There is no rule of thumb to

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interpret this ratio by 60 to 65 percent is considered to be a satisfactory ratio in case of industrial undertakings.

Fixed Assets to Proprietors Fund = Fixed Assets / Proprietors Fund

- **Current Assets to Proprietor's Fund Ratio:**

Current Assets to Proprietors' Fund Ratio establishes the relationship between current assets and shareholder's funds. The purpose of this ratio is to calculate the percentage of shareholders funds invested in current assets.

Current Assets to Proprietors Funds = Current Assets / Proprietor's Funds

- **Debt Service Ratio or Interest Coverage Ratio:** Interest coverage ratio is also known as debt service ratio or debt service coverage ratio. This ratio relates the fixed interest charges to the income earned by the business. It indicates whether the business has earned sufficient profits to pay periodically the interest charges. It is calculated by using the following formula. The interest coverage ratio is very important from the lender's point of view. It indicates the number of times interest is covered by the profits available to pay interest charges. Formula of Debt Service Ratio or interest coverage ratio :

[Interest Coverage Ratio = Net Profit before Interest and Tax / Fixed Interest Charges]

- **Capital Gearing Ratio:**

Closely related to solvency ratio is the **capital gearing ratio**. Capital gearing ratio is mainly used to analyze the capital structure of a company. The term capital structure refers to the relationship between the various long-term form of financing such as debentures, preference and equity share capital including reserves and surpluses. Leverage of capital structure ratios is calculated to test the long-term financial position of a firm.

[Capital Gearing Ratio = Equity Share Capital / Fixed Interest Bearing Funds]

(3) Profitability Ratios-

- **Gross Profit Ratio (GP Ratio):** Gross profit ratio (GP ratio) is the ratio of gross profit to net sales expressed as a percentage. It expresses the relationship between gross profit and sales. Gross profit ratio may be indicated to what extent the selling prices of goods per unit may be reduced without incurring losses on operations. It reflects efficiency with which a firm produces its products. As the gross profit is found by deducting cost of goods sold from net sales, higher the gross profit better it is. There is no standard GP ratio for evaluation. It may vary from business to business.

[Gross Profit Ratio = (Gross profit / Net sales) × 100]

- **Net Profit Ratio (NP Ratio):** Net profit ratio is the ratio of net profit (after taxes) to net sales. It is expressed as percentage. NP ratio is used to measure the overall profitability and hence it is very useful to proprietors. The ratio is very useful as if the net profit is not sufficient, the firm shall not be able to

achieve a satisfactory return on its investment. This ratio also indicates the firm's capacity to face adverse economic conditions such as price competition, low demand, etc. Obviously, higher the ratio the better is the profitability.

$$\text{Net Profit Ratio} = (\text{Net profit} / \text{Net sales}) \times 100]$$

- **Operating Ratio:** Operating ratio is the ratio of cost of goods sold plus operating expenses to net sales. It is generally expressed in percentage. Operating ratio shows the operational efficiency of the business. Lower operating ratio shows higher operating profit and vice versa. An operating ratio ranging between 75% and 80% is generally considered as standard for manufacturing concerns. This ratio is considered to be a yardstick of operating efficiency but it should be used cautiously because it may be affected by a number of uncontrollable factors beyond the control of the firm

$$\text{Operating Ratio} = [(\text{Cost of goods sold} + \text{Operating expenses}) / \text{Net sales}] \times 100$$

Expense Ratio: Expense ratios indicate the relationship of various expenses to net sales. Expense ratios are calculated by dividing each item of expenses or group of expense with the net sales to analyze the cause of variation of the operating ratio.

$$[\text{Particular Expense} = (\text{Particular expense} / \text{Net sales}) \times 100]$$

- **Return on Shareholders' Investment or Net worth Ratio:** It is the ratio of net profit to share holder's investment. It is the relationship between net profit (after interest and tax) and share holder's/proprietor's fund.

$$\text{Return on share holder's investment} = \{ \text{Net profit (after interest and tax)} / \text{Share holder's fund} \} \times 100$$

This ratio is one of the most important ratios used for measuring the overall efficiency of a firm. As the primary objective of business is to maximize its earnings, this ratio indicates the extent to which this primary objective of businesses being achieved.

- **Return on Equity Capital (ROEC) Ratio:**

In real sense, ordinary shareholders are the real owners of the company. They assume the highest risk in the company. (Preference share holders have a preference over ordinary shareholders in the payment of dividend as well as capital.

$$\text{Return on Equity Capital} = [(\text{Net profit after tax} - \text{Preference dividend}) / \text{Equity share capital}] \times 100$$

This ratio is more meaningful to the equity shareholders who are interested to know profits earned by the company and those profits which can be made available to pay dividends to them. Interpretation of the ratio is similar to the interpretation of return on shareholder's investments and higher the ratio better is.

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● **Return on Capital Employed Ratio (ROCE Ratio):**

The prime objective of making investments in any business is to obtain satisfactory return on capital invested. Hence, the return on capital employed is used as a measure of success of a business in realizing this objective. Return on capital employed ratio is considered to be the best measure of profitability in order to assess the overall performance of the business. It indicates how well the management has used the investment made by owners and creditors into the business.

Gross capital employed = Fixed assets + Investments + Current assets

Net capital employed = Fixed assets + Investments + Working capital*.

*Working capital = current assets – current liabilities.

Return on Capital Employed = (Adjusted net profits*/Capital employed) × 100]

● **Dividend Yield Ratio:**

Dividend yield ratio is the relationship between dividends per share and the market value of the shares. This ratio helps as intending investor knows the effective return he is going to get on the proposed investment.

Dividend Yield Ratio = Dividend per Share / Market Value per Share]

● **Dividend Payout Ratio:**

Dividend payout ratio is calculated to find the extent to which earnings per share have been used for paying dividend and to know what portion of earnings has been retained in the business. It is an important ratio because investing back of profits enables a company to grow and pay more dividends in future.

Dividend Payout Ratio = Dividend per Equity Share / Earnings per Share

A complementary of this ratio is retained earnings ratio. Retained earnings ratio is calculated by using the following formula:

[Retained Earnings Ratio = Retained Earning Per Equity Share / Earning Per Equity Share]

The payout ratio and the retained earnings ratio are the indicators of the amount of earnings that have been ploughed back in the business. The lower the payout ratio, the higher will be the amount of earnings ploughed back in the business and vice versa.

● **Earnings per Share (EPS) Ratio:** Earnings per share ratio (EPS Ratio) is a small variation of return on equity capital ratio and is calculated by dividing the net profit after taxes and preference dividend by the total number of equity shares.

Earnings per share (EPS) Ratio = (Net profit after tax – Preference dividend) / No. of equity shares (common shares)]

The earnings per share ratio is a good measure of profitability and when

compared with EPS of similar companies, it gives a view of the comparative earnings or earnings power of the firm. EPS ratio calculated for a number of years indicates whether or not the earning power of the company has increased.

Price Earnings Ratio (PE Ratio):

Price earnings ratio (P/E ratio) is the ratio between market price per equity share and earnings per share. Price earnings ratio helps the investor in deciding whether to buy or not to buy the shares of a particular company at a particular market price. Generally, higher the price earnings ratio the better it is. If the P/E ratio falls, the management should look into the causes that have resulted into the fall of this ratio.

Price Earnings Ratio = Market price per equity share / Earnings per share

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FUNDS FLOW STATEMENT

The funds-flow-statement is a report on changes in financial operations & flow or movements of funds during the period. It is a statement which shows the sources and application of funds or it shows how the activity of a business is financed in a particular period. In other words, such a statement shows how the financial resources have been used during a particular period of time. It is, thus, a historical statement showing sources and application of funds between the two dates designed especially to analyze the changes in the financial conditions of an enterprise. In the words of Foulke, it is- "A statement of Sources and Application of Funds is a technical device designed to analyze the changes in the financial condition of a business enterprises between two dates."

The objective of this statement can be outlined as below:

- (1) **Analysis of Financial Position.** The basic purpose of preparing the statement is to make the financial operations effective. It analyses how the funds were obtained and used in the past. In this sense, it is a valuable tool for the finance manager for analyzing the past and future plans of the firm and their impact on the liquidity.
- (2) **Evaluation of the Firm's Financing.** One important use of the statement is that it evaluates the firm's financing capacity. The analysis of sources of funds reveals how the firm's financed its development projects in the past i.e., from internal sources or from external sources. It also reveals the rate of growth of the firm.
- (3) **Effective Allocation of Resources.** In modern large scale business, available funds are always short for expansion programmes and there is always a problem of allocation of resources. It is, therefore, a need of evolving an order of priorities for putting through their expansion programmes which are phased accordingly, and funds have to be arranged as different phases of programmes get into their stride.
- (4) **Effective Communication to Outside World.** Funds Flow Statement helps in gathering the financial states of Business. In the present world of credit financing, it provides a useful information to bankers, creditors etc, regarding amount of loan required, its proposes, the terms of repayment sources for repayment of loan etc

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(5) **Can be used for Future Reference.** An analysis of Funds Flow Statements of several years reveals certain valuable information for the financial manager for planning the future financial requirements of the firm and their nature too i.e. Short term, long-term or midterm. The management can formulate its financial policies based on information gathered from the analysis of such statements. Financial manager can rearrange the firm's financing more effectively on the basis of such information along with the expected changes in trade payables and the various accruals. In this way, it guides the management in arranging its financing more effectively.

Preparation of Fund Flow Statement

(i) Prepare Schedule of Changes in working Capital to get Net increase/Decrease in working capital.

Current Assets	As on....	As on....	Increase(+)	Decrease(-)
<ul style="list-style-type: none"> • Cash Balance • Bank Balance • Marketable Securities • Accounts Receivable • Stock-in-Trade • Prepaid Expenses 				
Current Liabilities <ul style="list-style-type: none"> • Bank Overdraft • Accounts payable • Outstanding Expenses 				
Net Increase/Decrease in Working Capital				

(ii) Prepare Fund Flow Statement

Particulars	Amount	Particulars	Amount
Sources of funds Issues of Shares Issues of Debentures Long Term Borrowings Sale of fixed Assets Operating profit *Decrease in working capital		Application of funds Redemption of redeemable Shares Redemption of Debentures Payment of other long term loans Purchase of fixed assets Operating loss Payment of dividends, tax etc *Increase in working capital	

Example: From the following information prepare

- i) A Schedule of Changes in Working Capital
- ii) A Funds Flow Statement

Balance Sheet
of M/s _____ as on _____

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Liabilities	31 st March		Assets	31 st March	
	2006	2007		2006	2007
Capital	18,50,000	21,00,000	Goodwill (at Cost)	6,00,000	6,00,000
Profit/Loss	14,78,000	17,64,000	Land and Buildings	18,50,000	22,00,000
Appropriation	12,00,000	9,00,000	Plant and Machinery	4,74,000	5,24,000
Bank Loan	4,00,000	6,80,000	Furniture and Fittings	1,94,000	1,94,000
Bills Payable	14,00,000	12,20,000	Stock/Inventories	8,26,000	7,24,000
Sundry Creditors	2,00,000	1,80,000	Sundry Debtors	12,00,000	12,80,000
Reserve for Taxation			Bills Receivable	8,00,000	7,21,000
			Bank	5,00,000	4,83,000
			Cash	84,000	1,18,000
	65,28,000	68,44,000		65,28,000	68,44,000

Solution:

Schedule/Statement of Changes in Working Capital for the period from ___ to ___

Particulars/Account	Previous Period	Current Period	Working Capital Change	
			Increase	Decrease
A. CURRENT ASSETS				
1) Stock/Inventories	8,26,000	7,24,000		1,02,000
2) Sundry Debtors	12,00,000	12,80,000	80,000	
3) Bills Receivable	8,00,000	7,21,000		79,000
4) Bank	5,00,000	4,83,000		17,000
5) Cash	84,000	1,18,000	34,000	
	34,10,000	33,26,000	1,14,000	1,98,000
B. CURRENT LIABILITIES/PROVISIONS				
1) Bills Payable	14,00,000	12,20,000	1,80,000	
2) Sundry Creditors	2,00,000	1,80,000	20,000	
3) Provision for Taxation				
	20,00,000	20,80,000	3,14,000	4,78,000
Working Capital (A - B)	14,10,000	12,46,000		
Change in Working Capital	(12,46,000	14,10,000)		1,64,000
	(Or) (3,14,000	4,78,000)		

Working Notes:

In this problem, we need to prepare

- Capital a/c
- Profit and Loss Appropriation a/c Bank Loan a/c
- Land and Buildings a/c
- Plant and Machinery a/c

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Capital a/c

Dr				Cr			
Date	Particulars	J/F	Amount (in Rs)	Date	Particulars	J/F	Amount (in Rs)
31-03-07	To Balance c/d	-	21,00,000	01-04-06	By Balance b/d	-	18,50,000
				-	By Bank a/c (?)	-	2,50,000
	Total		21,00,000		Total		21,00,000
				01-04-07	By Balance b/d	-	21,00,000

Bank Loan a/c

Dr				Cr			
Date	Particulars	J/F	Amount (in Rs)	Date	Particulars	J/F	Amount (in Rs)
-	To Bank a/c (?)	-	3,00,000	01-04-06	By Balance b/d	-	12,00,000
31-03-07	To Balance c/d	-	9,00,000				
	Total		12,00,000		Total		12,00,000
				01-04-07	By Balance b/d	-	9,00,000

Land and Buildings a/c

Dr				Cr			
Date	Particulars	J/F	Amount (in Rs)	Date	Particulars	J/F	Amount (in Rs)
01-04-06	To Balance b/d	-	18,50,000	31-03-07	By Balance c/d	-	22,00,000
-	To Bank a/c (?)	-	3,50,000				
	Total		22,00,000		Total		22,00,000
01-04-07	To Balance b/d	-	9,00,000				

Plant and Machinery a/c

Dr

Cr

Date	Particulars	J/F	Amount (in Rs)	Date	Particulars	J/F	Amount (in Rs)
01-04-06	To Balance b/d	-	4,74,000	31-03-07	By Balance c/d	-	5,24,000
-	To Bank a/c (?)	-	50,000				
	Total		5,24,000		Total		5,24,000
01-04-07	To Balance b/d	-	5,24,000				

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Profit and Loss Appropriation a/c

Date	Particulars	J/F	Amount (in Rs)	Date	Particulars	J/F	Amount (in Rs)
31-03-07	To Balance c/d	-	17,64,000	01-04-06	By Balance b/d	-	14,78,000
				31-03-07	By P/L (FFO) a/c	-	2,86,000
	Total		17,64,000		Total		17,64,000
				01-04-07	By Balance b/d	-	17,64,000

Changes in Fund Accounts

Item	Amount Previous Period	Amount Current Period	Change	Nature	Result
Capital	18,50,000	21,00,000	2,50,000	Liability - Increase	Inflow
Profit/Loss Appropriation	14,78,000	17,64,000	2,86,000	Liability - Increase	Inflow
Bank Loan	12,00,000	9,00,000	3,00,000	Liability - Increase	Inflow
Land and Building	18,50,000	22,00,000	3,50,000	Liability - Increase	Inflow
Plant and Machinery	3,70,000	4,74,000	50,000	Asset - Increase	Outflow

Funds Flow Statement

Statement of Sources and Applications of Funds for the period from __ to __			
Sources (Inflow) of Funds	Amount	Applications (Outflow) of Funds	Amount
1) Capital	2,50,000	1) Land and Buildings	3,50,000
2) Profit/Loss Appropriation	2,86,000	2) Plant and Machinery	50,000
		3) Bank Loan	3,00,000
	5,36,000		7,00,000
		Change in Working Capital	1,64,000

CASH FLOW STATE

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The cash flow statement shows how much cash comes in and goes out of the company over the quarter or the year. It sounds like the income statement in that it records financial performance over a specified period. But there is a big difference between the two.

What distinguishes the two is the principle of accrual accounting, on which only the income statement is based. Accrual accounting requires companies to record revenues and expenses when transactions occur, not when cash is exchanged. At the same time, the income statement, on the other hand, often includes non-cash revenues or expenses, which the statement of cash flows does not include.

Example- The income statement shows net income of \$10 does not mean that cash on the balance sheet will increase by \$10. Whereas when the bottom of the cash flows statement reads \$10 net cash inflow that means the increase in cash by \$ 10.

Cash flow statement is divided into three sections: cash flows from operations, financing and investing.

- Cash flow from operating activities - This section measures the cash used or provided by a company's normal operations. It shows the company's ability to generate consistently positive cash flow from operations. Think of "normal operations" as the core business of the company. For example, Microsoft's normal operating activity is selling software. Some cash flows in this respect are
 - Cash receipt for the sale of goods
 - Cash receipt from sale of royalties
 - cash payment on behalf of employees
 - cash payment for taxes cash payment for premiums of insurances
- Cash flows from investing activities - This area list all the cash used or provided by the purchase and sale of income-producing assets. If Microsoft, again our example, bought or sold companies for a profit or loss, the resulting figures would be included in this section of the cash flow statement. Some cash flows in this respect are
 - Cash payment for acquiring assets
 - Cash receipt from disposal of fixed assets
 - Cash payment for acquiring shares
 - Cash receipt from disposal of shares
- Cash flows from financing activities - This section measures the flow of cash between a firm and its owners and creditors. Negative numbers can mean the company is servicing debt but can also mean the company is making dividend payments and stock repurchases, which investors might be glad to see. Some cash flows in this respect are

- Cash receipts from issuing shares or debentures
- Cash payment for redemption of debentures

Distinction between funds flow statement and cash flow statement

A distinction between these two statements may be briefed as under:-

- (i) Funds Flow Statement is concerned with all items constituting funds (Working Capital) for the business while Cash Flow Statement deals only with cash transactions. In other words, a transaction affecting working capital other than cash will affect Funds statement, and not the Cash Flow Statement.
- (ii) In Funds Flow Statement, net increase or decrease in working capital is recorded while in Cash Flow Statement; individual item involving cash is taken into account.
- (iii) Funds Flow statement is started with the opening cash balance and closed with the closing cash balance records only cash transactions.
- (iv) Cash Flow Statement is started with the opening cash balance and closed with the closing cash balance while there are no opening or closing balances in Funds Flow Statement.

Uses of Cash Flow Statement

- (i) **Planning and Co-ordination of Financial Operations.** Cash Flow Statement is useful in evaluating Financial policies and current cash position. Since cash is the basis for carrying on operations, the Cash Flow Statement prepared on an estimated basis for the next accounting period will enable the management to plan and co-ordinate the financial operations probably. The management comes to know how much cash is needed in the future and at what time and how can it be arranged-how much internally and how much from outside. It is especially useful in preparing cash budgets.
- (ii) **A Control Device.** Cash Flow statement is also a control device for the management. A comparison of cash flow statement of previous year with the budget for that year would indicate to what extent the resources of the enterprise were raised and applied according to the plan. Thus a comparison of original forecast with actual results may highlight trends of movement that might otherwise go undetected.
- (iii) **Useful to internal Financial Management.** Since it gives a clear picture of cash inflow from operations (and not income flow of operation), it is, therefore, very useful to internal financial management in considering the possibility of retiring long-term debts, in planning replacement of plant facilities or in formulating dividend policies.
- (iv) **Profit and Cash Positions.** It enables the management to account for situation when business has earned huge profits yet run without money or when it has suffered a loss and still has plenty of money at the bank.

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- (v) **Short-term Financial Decisions.** Cash Flow Statement helps the management in taking short-term financial decisions. Suppose, if firm wants to know its state of solvency after one-month from to date, it is possible only from Cash Flow analysis and not from Fund Flow Statement. Shorter the period, greater is the importance of Cash Flow Statement.

OBJECTIVE OF CASH FLOW STATEMENTS:

Cash Flow statement is prepared with an objective to high light the sources and uses of cash and cash equivalents for a period. Cash flow statement is classified under operating activities and financing activities. It shows the net increase or net decrease of cash and cash equivalents under each activity.

LIMITATIONS OF CASH FLOW STATEMENT

Through the cash flow Statement is a very useful tool of financial analysis, yet it has its own limitations which must be kept in mind at the time of its use. These limitations are:

1. Non-Cash Transactions are ignored.
2. Not a Substitute for Income Statement.
3. Not a test of Total Financial Position.
4. Historical in Nature.

Procedure for preparing Cash Flow Statement

- (i) It starts with opening or closing balance
- (ii) All the inflows of cash are added & outflows of cash are deducted.
- (iii) The balance is reconciled with the balance of cash.

Sources of cash inflow

- Cash flow from operations
- Increase in existing liabilities or creation of new liabilities.
- Reduction in or sale of assets.

Application of cash

- Cash lost in operations
- Discharge of liabilities
- Purchase of assets
- Non trading payments

Format of Cash Flow Statement Approved by SEBI is given below:

Cash Flow Statement for the year ended.....

Particulars	Amount
A. Cash Flow Operating Activities	
Net Profit/Loss before tax and extraordinary items	
Adjustments for:	
Depreciation	
Gain/Loss on sale of fixed assets	
Foreign exchange	
Miscellaneous expenditure written off	
Investment income	
Interest	
Dividend	
Operating profit before working capital changes	
Adjustments for:	
Trade and other receivables	
Inventories	
Trade Payables	
Cash generated from operations	
Interest paid	
Direct taxes paid	
Cash flow before items	
Extraordinary items	
Net Cash from Operating Activities	
B. Cash Flow From Investing Activities	
Purchase of fixed assets	
Sales of fixed assets	
Purchase of investments	
Sale of investments	
Interest received	
Dividend received	
Net Cash from/used in investing activities	
C. Cash Flow Financing Activities	
Proceeds from issue of share capital	
Proceeds from long-term borrowings/banks	
Payment of long-term borrowings	
Dividend paid	
Net Cash from /used in financing activities.	
Net Increase /Decrease in Cash and Cash Equivalents	
Cash and Cash Equivalents as at.....(Opening Balance)	
Cash and Cash Equivalents as at.....(Closing Balance)	

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Example-XYZ Company started on January 1, 2003, when it issued 60,000 shares of \$1 par value common stock for \$60,000 cash. The company rented its office space and furniture and equipment, and it performed tax consulting services throughout the first year. The comparative balance sheets at the beginning and at the end of the year 2003 appear as follows.

	Dec. 31, 2003	Jan. 2003	Change Increase/Decrease
Assets			
Cash	\$49,000	\$-0-	\$49,000 increase
Accounts receivable	\$36,000	\$-0-	\$36,000 increase
Total	<u>\$85,000</u>	<u>\$-0-</u>	
Liabilities and Stockholder's Equity			
Accounts payable	\$ 5,000	\$-0-	\$ 5,000 increase
Common stock	\$60,000	\$-0-	\$60,000 increase
Retained earnings	\$20,000	\$-0-	\$20,000 increase
Total	<u>\$85,000</u>	<u>\$-0-</u>	

The income statement and additional information for Tax Consultation Inc. are as follows.

Revenue	\$125,000
Operating expenses	\$ 85,000

Income before income taxes	\$ 40,000
Income tax expenses	\$ 6,000

Net income	<u>\$ 34,000</u>

Solution:

- (i) The Company has no cash on hand at the beginning of the year 2003, but \$49,000 at the end of 2003. Thus the change in cash for 2003 was an increase of \$49,000
- (ii) Determine Net Cash Flow from Operating Activities:

Cash collected from revenues	\$89,000
Cash payment for expenses	\$80,000

Income before income taxes	\$ 9,000
Cash payments for income taxes	\$ 6,000

Net cash provided by operating activities	<u>\$ 3,000</u>

Cash flow statement
For the year ended December 31, 2003

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Cash Flows From Operating Activities:		
Net income		\$34,000
Adjustments to reconcile net income to net cash provided by operating activities:		
Increase in accounts receivable	\$(36,000)	
Increase in accounts payable	\$ 5,000	
Net cash provided by operating activities		(\$31,000)
Cash Flows From Financing Activities:		\$ 3,000
Issuance of common stock		
Payment of cash dividend		
	\$60,000	
Net cash provided by financing activities	\$(14,000)	
Net increase in cash		\$46,000
Cash, January 1, 2003		
		49,000
Cash, December 31, 2003		-0-

		<u>\$49,000</u>

COST-VOLUME-PROFIT (CVP) ANALYSIS

Cost-volume-profit (CVP) analysis is a technique that examines changes in profits in response to changes in sales volumes, costs, and prices. Accountants often perform CVP analysis to plan future levels of operating activity and provide information about:

- Which products or services to emphasize?
- The volume of sales needed to achieve a targeted level of profit.
- The amount of revenue required to avoid losses.
- Whether to increase fixed costs?
- How much to budget for discretionary expenditures?
- Whether fixed costs expose the organization to an unacceptable level of risk?

Cost-volume-profit analysis (CVP) is used to compute the volume level at which total revenues are equal to total costs. When total costs and total revenues are

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equal, the business organization is said to be "breaking even." The analysis is based on a set of linear equations for a straight line and the separation of variable and fixed costs.

Total variable costs are considered to be those costs that vary as the production volume changes. In a factory, production volume is considered to be the number of units produced, but in a governmental organization with no assembly process, the units produced might refer, for example, to the number of welfare cases processed.

Objectives of CVP Analysis:

Cost volume profit analysis (CVP analysis) is one of the most powerful tools that managers have at their command. It helps them understand the interrelationship between cost, volume, and profit in an organization by focusing on interactions among the following five elements:

1. Prices of products
2. Volume or level of activity
3. Per unit variable cost
4. Total fixed cost
5. Mix of product sold

Because cost-volume-profit (CVP) analysis helps managers understand the interrelationships among cost, volume, and profit it is a vital tool in many business decisions.

Contribution Margin:

Contribution margin is the amount remaining from sales revenue after variable expenses have been deducted. Thus it is the amount available to cover fixed expenses and then to provide profits for the period. Contribution margin is first used to cover the fixed expenses and then whatever remains go towards profits. If the contribution margin is not sufficient to cover the fixed expenses, then a loss occurs for the period. This concept is explained in the following equations:

Sales revenue " Variable cost* = Contribution Margin

***Both Manufacturing and Non Manufacturing**

Contribution margin " Fixed cost* = Net operating Income or Loss

***Both Manufacturing and Non Manufacturing**

For further clarification of the basic concept of cost volume and profit Analysis (CVP analysis) we now take an example.

Example:

Assume that XYZ Private Ltd. has been able to sell only one unit of product during the period. If company does not sell any more units during the period, the company's contribution margin income statement will appear as follows:

XYZ Private Ltd Contribution margin Income Statement For the month of—

Overheads Classification
and Financial Costing/
Analysis

	Total	Per Unit
Sales (1 Unit only)	\$250	\$250
Less Variable expenses	150	150
Contribution margin	100	100
Less fixed expenses	35,000	=====
Net operating loss	\$(34,900)	

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For each additional unit that the company is able to sell during the period, \$100 more in contribution margin will become available to help cover the fixed expenses. If a second unit is sold, for example, then the total contribution margin will increase by \$100 (to a total of \$200) and the company's loss will decrease by \$100, to \$34800. If enough units can be sold to generate \$35,000 in contribution margin, then all of the fixed costs will be covered and the company will have managed to at least break even for the month—that is to show neither profit nor loss but just cover all of its costs. To reach the point, the company will have to sell 350 units in a period, since each unit sold contribute \$100 in the contribution margin. This is shown as follows by the contribution margin format income statement.

XYZ Private Ltd
Contribution Margin Income Statement
For the month of—

	Total	Per Unit
Sales (350 Units)	\$87,500	\$250
Less variable expenses	52,500	150
Contribution margin	35,000	\$100
Less fixed expenses	35,000	=====
Net operating profit	\$0	

Note that the break even is the level of sales at which profit is ZERO.

Once the point has been reached, net income will increase by unit contribution margin by each additional unit sold. For example, if 351 units are sold during the period then we can expect that the net income for the month will be \$100, since the company will have sold 1 unit more than the number needed to break even. This is explained by the following contribution margin income statement.

XYZ Private Ltd
Contribution Margin Income Statement
For the month of _____

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	Total	Per Unit
Sales (351 Units)	\$87,750	\$250
Less Variable expenses	52,500	150
	-----	-----
Contribution margin	35,100	100
Less fixed expenses	35,000	=====

Net operating loss	\$100	
	=====	

If 352 units are sold then we can expect that net operating income for the period will be \$200 and so forth. To know what the profit will be at various levels of activity, therefore, managers do not need to prepare a whole series of income statements. To estimate the profit at any point above the point, the manager can simply take the number of units to be sold above the and multiply that number by the unit contribution margin. The result represents the anticipated profit for the period. Or to estimate the effect of a planned increase in sale on profits, the manager can simply multiply the increase in units sold by the unit contribution margin. The result will be expressed as increase in profits. To illustrate it suppose company is currently selling 400 units and plans to sell 425 units in near future, the anticipated impact on profits can be calculated as follows.

Increased number of units to be sold	25
Contribution margin per unit	×100

Increase in the net operating income	2,500
	=====

To summarize these examples, if there were no sales, the company's loss would equal to its **fixed expenses**. Each unit that is sold reduces the loss by the amount of the **unit contribution margin**. Once the point has been reached, each additional unit sold increases the company's profit by the amount of the unit contribution margin.

Difference between Gross Margin and Contribution Margin:

Gross Margin is the **Gross Profit** as a percentage of Net Sales. The calculation of the Gross Profit is: Sales minus Cost of Goods Sold. The Cost of Goods Sold consists of the fixed and variable product costs, but it excludes all of the selling and administrative expenses.

Contribution Margin is Net Sales minus the variable product costs and the variable period expenses. The Contribution Margin Ratio is the Contribution Margin as a percentage of Net Sales.

Example:

Let's illustrate the difference between gross margin and contribution margin with the following information: company had Net Sales of \$600,000 during the past year. Its inventory of goods was the same quantity at the beginning and at the end of year. Its Cost of Goods Sold consisted of \$120,000 of variable costs and \$200,000 of fixed costs. Its selling and administrative expenses were \$40,000 of variable and \$150,000 of fixed expenses.

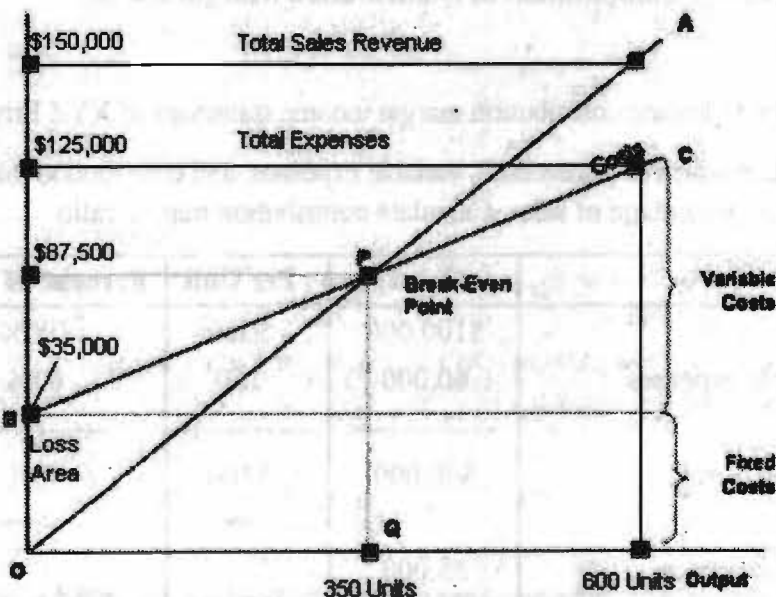
The company's Gross Margin is: Net Sales of \$600,000 minus its Cost of Goods Sold of \$320,000 (\$120,000 + \$200,000) for a Gross Profit of \$280,000 (\$600,000 - \$320,000). The Gross Margin or Gross Profit Percentage is the Gross Profit of \$280,000 divided by \$600,000, or 46.7%.

The company's Contribution Margin is: Net Sales of \$600,000 minus the variable product costs of \$120,000 and the variable expenses of \$40,000 for a Contribution Margin of \$440,000. The Contribution Margin Ratio is 73.3% (\$440,000 divided by \$600,000).

Preparing a CVP Graph or Break-Even Chart:

In a CVP graph sometimes called a break even chart unit volume is commonly represented on the horizontal (X) axis and dollars on the vertical (Y) axis. Preparing a CVP graph involves three steps.

1. Draw a line parallel to the volume axis to present total fixed expenses. For example we assume total fixed expenses \$35,000.



2. Choose some volume of sales and plot the point representing total expenses (fixed and variable) at the activity level you have selected. For example we select a level of 600 units. Total expenses at that activity level are as follows:

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Fixed Expenses	\$35,000
Variable Expenses (150×600)	\$90,000

Total Expenses	\$125,000
	=====

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After the point has been plotted, draw a line through it back to the point where the fixed expenses line intersects the dollars axis.

- Again choose some volume of sales and plot the point representing total sales dollars at the activity level you have selected. For example we have chosen a volume of 600 units. Sales at this activity level are \$150,000 (600units × \$250) draw a line through this point back to the origin. The point is where the total revenue and total expense lines cross. See the graph and note that point is at 350 units. It means when the company sells 350 units the profit is zero. When the sales are below the break even the company suffers a loss. When sales are above the breakeven point, the company earns a profit and the size of the profit increases as sales increase.

CONTRIBUTION MARGIN RATIO:

The contribution margin as a percentage of total sales is referred to as **contribution margin ratio (CM Ratio)**.

Formula of CM Ratio:

$$\text{CM Ratio} = \text{Contribution Margin} / \text{Sales}$$

This ratio is extensively used in cost-volume profit calculations.

Calculation / Computation of Contribution Margin Ratio:

Example:

Consider the following contribution margin income statement of XYZ Private Ltd private Ltd. in which sales revenues, variable expenses, and contribution margin are expressed as percentage of sales. Calculate contribution margin ratio

	Total	Per Unit	Percent of Sales
Sales (400 units)	\$100,000	\$250	100%
Less variable expenses	60,000	150	60%
	-----	-----	-----
Contribution margin	\$40,000	\$100	40%
		=====	=====
Less fixed expenses	35,000		

Net operating income	\$5,000		
	=====		

According to above data of XYZ Private Ltd. the computations are:

$$\begin{aligned}\text{Contribution Margin Ratio} &= (\text{Contribution Margin} / \text{Sales}) \times 100 \\ &= (\$40,000 / \$100,000) \times 100 \\ &= 40\%\end{aligned}$$

In a company that has only one product such as XYZ Private Ltd CM ratio can also be calculated as follows:

$$\begin{aligned}\text{Contribution Margin Ratio} &= (\text{Unit contribution margin} / \text{Unit selling price}) \times 100 \\ &= (\$100 / \$250) \times 100 \\ &= 40\%\end{aligned}$$

Applications of Cost Volume Profit (CVP) Concepts:

Now we can explain how CVP concepts developed on above pages can be used in planning and decision making. We shall use these concepts to show how changes in variable costs, fixed costs, sales price, and sales volume affect contribution margin and profitability of companies in a variety of situations. For Example

- Change in variable cost and sales volume
- Change in fixed cost, sales price and sales volume
- Change in variable cost, fixed cost, and sales volume
- Change in regular sales price

Assumptions of Cost-Volume-Profit (CVP) Analysis:

A number of assumptions underlie cost-volume-profit (CVP) analysis: These cost volume profit analysis assumptions are as follows:

1. Selling price is constant. The price of a product or service will not change as volume changes.
2. Costs are linear and can be accurately divided into variable and fixed elements. The variable element is constant per unit, and the fixed element is constant in total over the relevant range.
3. In multi-product companies, the sales mix is constant.
4. In manufacturing companies, inventories do not change. The number of units produced equals the number of units sold.

Limitations of Cost-Volume-Profit (CVP) Analysis:

Cost volume profit (CVP) is a **short run, marginal analysis**: it assumes that unit variable costs and unit revenues are constant, which is appropriate for small deviations from current production and sales, and assumes a neat division between fixed costs and variable costs, though in the long run all costs are variable. For longer-term analysis that considers the entire life-cycle of a product, one therefore often prefers activity-based costing or throughput accounting.

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BREAK EVEN ANALYSIS:

Break even is the level of sales at which the profit is zero. Cost volume profit analysis is some time referred to simply as break even analysis. This is unfortunate because break even analysis is only one element of cost volume profit analysis. Break even analysis is designed to answer questions such as "How far sales could drop before the company begins to lose money." For detailed study about break even click on a link below:

Definition of Break even point:

Breakeven point is the level of sales at which profit is zero. According to this definition, at breakeven point sales are equal to **fixed cost plus variable cost**. This concept is further explained by the following equation:

$$[\text{Break even sales} = \text{fixed cost} + \text{variable cost}]$$

The breakeven point can be calculated using either the **equation method** or **contribution margin method**. These two methods are equivalent.

Equation Method:

The **equation method** centers on the contribution approach to the income statement. The format of this statement can be expressed in equation form as follows:

$$[\text{Profit} = (\text{Sales} - \text{Variable expenses}) - \text{Fixed expenses}]$$

Rearranging this equation slightly yields the following equation, which is widely used in cost volume profit (CVP) analysis:

$$[\text{Sales} = \text{Variable expenses} + \text{Fixed expenses} + \text{Profit}]$$

According to the definition of breakeven point, breakeven point is the level of sales where profits are zero. Therefore the breakeven point can be computed by finding that point where sales just equal the total of the variable expenses plus fixed expenses and profit is zero.

Example:

For **example** we can use the following data to calculate breakeven point.

- Sales price per unit = \$250
- variable cost per unit = \$150
- Total fixed expenses = \$35,000

Calculate breakeven point

Calculation:

$$\text{Sales} = \text{Variable expenses} + \text{Fixed expenses} + \text{Profit}$$

$$\$250Q^* = \$150Q^* + \$35,000 + \$0^{**}$$

$$\$100Q = \$35,000$$

$$Q = \$35,000 / \$100$$

Q = 350 Units

Q* = Number (Quantity) of units sold.

**The breakeven point can be computed by finding that point where profit is zero

The breakeven point in sales dollars can be computed by multiplying the breakeven level of unit sales by the selling price per unit.

$$350 \text{ Units} \times \$250 \text{ per unit} = \$87,500$$

Contribution Margin Method:

The contribution margin method centers on the idea that each unit sold provides a certain amount of contribution margin that goes toward covering fixed cost. To find out how many units must be sold to break even, divide the total fixed cost by the unit contribution margin.

$$\text{Breakeven point in units} = \text{Fixed expenses} / \text{Unit contribution margin}$$

$$\$35,000 / \$100^* \text{ per unit}$$

350 Units

$$*\$250 \text{ (Sales)} - \$150 \text{ (Variable exp.)}$$

A variation of this method uses the Contribution Margin ratio (CM ratio) instead of the unit contribution margin. The result is the break even in total sales dollars rather than in total units sold.

$$\text{Breakeven point in total sales dollars} = \text{Fixed expenses} / \text{CM ratio}$$

$$\$35,000 / 0.40$$

$$= \$87,500$$

This approach is particularly suitable in situations where a company has multiple products lines and wishes to compute a single breakeven point for the company as a whole.

The following formula is also used to calculate breakeven point

$$\text{Break Even Sales in Dollars} = [\text{Fixed Cost} / 1 - (\text{Variable Cost} / \text{Sales})]$$

This formula can produce the same answer:

$$\text{Break Even Point} = [\$35,000 / 1 - (150 / 250)]$$

$$= \$35,000 / 1 - 0.6$$

$$= \$35,000 / 0.4$$

$$= \$87,500$$

Benefits / Advantages of Break Even Analysis:

The main advantages of breakeven point analysis are that it explains the relationship between cost, production, volume and returns. It can be extended to show how changes in fixed cost, variable cost, commodity prices, and revenues will affect profit levels and break even points. Break even analysis is most useful when used with partial budgeting, capital budgeting techniques. The major benefits to use break even analysis are that it indicates the lowest amount of business activity necessary to prevent losses.

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Assumption of Break Even Point:

The Break-even Analysis depends on three key assumptions:

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- 1. Average per-unit sales price (per-unit revenue):** This is the price that you receive per unit of sales taking into account sales discounts and special offers. Get this number from your Sales Forecast. For non-unit based businesses, make the per-unit revenue \$1 and enter your costs as a percent of a dollar. The most common questions about this input relate to averaging many different products into a single estimate. The analysis requires a single number, and if you build your Sales Forecast first, then you will have this number. You are not alone in this, the vast majority of businesses sell more than one item, and have to average for their Break-even Analysis.

Average per-unit cost: This is the incremental cost, or variable cost, of each unit of sales. If you buy goods for resale, this is what you paid, on average, for the goods you sell. If you sell a service, this is what it costs you, per dollar of revenue or unit of service delivered, to deliver that service. If you are using a Units-Based Sales Forecast table (for manufacturing and mixed business types), you can project unit costs from the Sales Forecast table. If you are using the basic Sales Forecast table for retail, service and distribution businesses, use a percentage estimate, e.g., a retail store running a 50% margin would have a per-unit cost of .5, and per-unit revenue of 1.

- 2. Monthly fixed costs:** Technically, a break-even analysis defines fixed costs as costs that would continue even if you went broke. Instead, we recommend that you use your regular running fixed costs, including payroll and normal expenses (total monthly Operating Expenses). This will give you a better insight on financial realities. If averaging and estimating is difficult, use your Profit and Loss table to calculate a working fixed cost estimate—it will be a rough estimate, but it will provide a useful input for a conservative Break-even Analysis.

Limitations of Break Even Analysis:

It is best suited to the analysis of one product at a time. It may be difficult to classify a cost as all variable or all fixed; and there may be a tendency to continue to use a break even analysis after the cost and income functions have changed.

Review Problem:

Volter Company manufactures and sells a telephone answering machine. The company's contribution format income statement for the most recent year is given below:

	Total	Per Unit	Percent of Sales
Sales	\$1,200,000	\$60	100%
Less variable expenses	900,000	45	?%
	-----	-----	-----
Contribution margin	300,000	15	?%
Less fixed expenses	240,000	=====	=====

Net operating income	\$60,000	=====	

Calculate breakeven point both in units and sales dollars. Use the equation method.

Solution:

$$\text{Sales} = \text{Variable expenses} + \text{Fixed expenses} + \text{Profit}$$

$$\$60Q = \$45Q + \$240,000 + \$0$$

$$\$15Q = \$240,000$$

$$Q = \$240,000 / 15 \text{ per unit}$$

$$Q = 16,000 \text{ units; or at } \$60 \text{ per unit, } \$960,000$$

Alternative solution:

$$X = 0.75X + 240,000 + \$0$$

$$0.25X = \$240,000$$

$$X = \$240,000 / 0.25$$

$$X = \$960,000; \text{ or at } \$60 \text{ per unit, } 16,000 \text{ units}$$

Margin of safety (MOS) Definition and Explanation:

Margin of safety (MOS) is the excess of budgeted or actual sales over the break even volume of sales. It states the amount by which sales can drop before losses begin to be incurred. The higher the margin of safety, the lower the risk of not breaking even.

Formula of Margin of Safety:

The formula or equation for the calculation of margin of safety is as follows:

$$[\text{Margin of Safety} = \text{Total budgeted or actual sales} - \text{Break even sales}]$$

The margin of safety can also be expressed in percentage form. This percentage is obtained by dividing the margin of safety in dollar terms by total sales. Following equation is used for this purpose.

$$[\text{Margin of Safety} = \text{Margin of safety in dollars} / \text{Total budgeted or actual sales}]$$

Example:

Sales(400 units @ \$250)	\$100,000
Break even sales	\$87,500
Calculate margin of safety	

Calculation:

Sales(400units @\$250)	\$100,000
Break even sales	\$ 87,500

Margin of safety in dollars	\$ 12,500

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margin of safety as a percentage of sales:

$$\begin{aligned} & 12,500 / 100,000 \\ & = 12.5\% \end{aligned}$$

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It means that at the current level of sales and with the company's current prices and cost structure, a reduction in sales of \$12,500, or 12.5%, would result in just breaking even. In a single product firm, the margin of safety can also be expressed in terms of the number of units sold by dividing the margin of safety in dollars by the selling price per unit. In this case, the margin of safety is 50 units ($\$12,500 \div \$250 \text{ units} = 50 \text{ units}$).

Review Problem:

Volstar Company manufactures and sells a telephone answering machine. The company's contribution margin income statement for the most recent year is given below:

	Total	Per Unit	Percent of Sales
Sales (20,000 units)	\$ 1,200,000	\$60	100%
Less variable expenses	900,000	\$45	7%
	-----	-----	-----
Contribution margin	300,000	\$15	7%
Less fixed expenses	240,000	=====	=====

Net operating income	60,000		
	=====		

Required: Calculate margin of safety both in dollars and percentage form.

Solution:

$$\begin{aligned} \text{Margin of safety} &= \text{Total sales} - \text{Break even sales}^* \\ &= \$1,200,000 - \$960,000 \\ &= \$240,000 \end{aligned}$$

$$\begin{aligned} \text{Margin of safety percentage} &= \text{Margin of safety in dollars} / \text{Total sales} \\ &= \$240,000 / \$1,200,000 \\ &= 20\% \end{aligned}$$

*The break even sales have been calculated as follows:

$$\text{Sales} = \text{Variable expenses} + \text{Fixed expenses} + \text{Profit}$$

$$\$60Q = \$45Q + \$240,000 + \$0^{**}$$

$$\$15Q = \$240,000$$

$$Q = \$240,000 / \$15 \text{ per unit}$$

$$Q = 16,000 \text{ units; or at } \$60 \text{ per unit. } \$960,000$$

**We know that break even is the level of sales where profit is zero

Financial forecasting is looking ahead to develop a financial plan for the future. A forecast is a prediction about a future condition or situation. In terms of a business, financial forecasting means looking ahead to a point in the future and trying to estimate the financial situation that the company will be in at that time. Decisions about whether to spend more or less money on a project today will be determined by financial forecasting. A company needs to feel secure that their future finances will be able to recover the money they have spent and keep their bank balances healthy. Most organizations with strong financial departments spend a lot of time and effort on financial forecasting. The nature of the business world means that managers need to look ahead and plan for a future that is in no way certain. Financial forecasting helps a company to make important decisions today that will affect the company in the future. These decisions affect things like whether to spend or borrow money, where to invest or when to start a new project.

The difficulty with financial forecasting is that it involves uncertainty. The future is uncertain and a single financial policy can have numerous results. However, when businesses draw up strategies to deal with risk management they build in forecasting procedures which strengthen the company's position. Risk cannot be eliminated by financial forecasting but it is beneficial for a company to have a better understanding of what the future could hold. Companies accept that uncertainty is an integral part of any financial forecast. Another important thing to consider is the timing of a financial forecast. Forecasts necessarily need to be updated because new information comes to light and things are constantly changing. So managers need to think about a series of financial forecasts, not just one. The question then becomes "how often do forecasts need to be made?" Each time there is an updated forecast there will be an additional cost. Linked to this is the need to establish how far into the future a forecast needs to reach. A ten year forecast will be more complicated – and expensive – than a two year forecast.

Financial forecasting Methods

- Percent of Sales Method
- Linear Trend Extrapolation
- Regression Analysis

Percent of Sales Method

The Percentage of Sales Method is a Financial Forecasting approach which is based on the assumption that most Balance Sheet and Income Statement Accounts vary with sales. Therefore, the key driver of this method is the Sales Forecast and based upon this, forecasted Financial Statements can be constructed and the firms needs for external financing can be identified.

Linear Trend Extrapolation

This method examines trends and cycles in historical data, and then use mathematical techniques to estimate value to the future. The assumption of all these techniques is

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that the forces responsible for creating the past will continue to operate in the future. This is often a valid assumption when forecasting short term horizons, but it falls short when creating medium and long term forecasts.

The stability of the environment is the key factor in determining whether trend extrapolation is an appropriate forecasting model. The concept of "developmental inertia" embodies the idea that some items are more easily changed than others. Clothing styles is an example of an area that contains little inertia. It is difficult to produce reliable mathematical forecasts for clothing. Energy consumption, on the other hand, contains substantial inertia and mathematical techniques work well. The developmental inertia of new industries or new technology cannot be determined because there is not yet a history of data to draw from.

There are many mathematical models for forecasting trends and cycles. Choosing an appropriate model for a particular forecasting application depends on the historical data. The study of the historical data is called exploratory data analysis. Its purpose is to identify the trends and cycles in the data so that appropriate model can be chosen.

Regression Analysis

Regression is the study of relationships among variables, a principal purpose of which is to predict, or estimate the value of one variable from known or assumed values of other variables related to it. To make predictions or estimates we must identify the effective predictors of the variable of interest: which variables are important indicators and can be measured at the least cost, which carry only a little information, and which are redundant.

INVESTMENT & PORTFOLIO STRATEGIES

Simply, Investment refers to purchase of financial assets. Investment is done for further gain in future. The process of Investment is not so easy. It is very much complicated due to versatility in the instruments. While crating the portfolio very much research is to be done. The portfolio strategy selected would have to be in conformity with both the investment objective and investment policy guidelines. Any contradiction here would result in losses.

Let's consider a person with a job that keeps him busy for 10-12 hours a day, five days of the week. On Saturday he helps the family with household chores. On Sunday he takes the day off and enjoys himself. Now with such a busy life, we cannot expect him to obtain optimal returns from investments in the equity market. For a person with such a busy life schedule it would be best to invest in fixed income securities. These would include RBI bonds, Bank deposits, insurance, etc. Where there is a lower but assured return. However, if this average, hard working and successful person still wants to invest in the equity market for a relatively higher rate of return. Then he would have to create the time for the thought, analysis and action required for success in this endeavor.

Portfolio strategies are mainly of two types; which are active portfolio strategies and passive portfolio strategies. Active strategies have a higher expectation about the

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factors that are expected to influence the performance of the asset classes. While passive strategies involve a minimum expectation input. The latter would include indexing which would require the investor to replicate the performance of a particular index. Between these two extremes we have a range of other strategies which have elements of both active and passive strategies. In the fixed income segment, structured portfolio strategies have become popular. Here the aim would be to achieve a predetermined performance in relation to a benchmark. These are frequently used to fund liabilities.

The individual investors who wish to adopt an active portfolio strategy would be required to look into matters of market timing, sector rotation, stock selection and conceptualization. Market timing the purchase of stocks in the stock market would by default reduce the subsequent holding period of the stocks held in the portfolio with the expectation of a reasonable expectation of return at the point of sale, with the advantage of the financial resources again being available to be applied with regard to other stocks which may provide both opportunities of purchase as well as a fair margin of safety at the point of their subsequent purchase. This would also result in the turning over of the investment capital during the financial period in which this strategy is implemented. Sector rotation would require an understanding of the segregation of the various stocks into appropriate industries and service sector groups. The investor may now consider short listing the top three to five corporate entities from each of the lead industries and service sector groups for a further study to decide whether the stocks short listed are of investment grade. Thereafter, the investor would be required to move the investment capital from one industry and/or service sector group to another depending on the availability of a fair margin of safety while engaging such stocks and adequate profits while disengaging from them.

Stock selection would require a short listing of the investment grade stocks for analysis based on fundamental parameters to confirm their present status of being investment worthy. A further study to check and confirm whether the current market price of such stocks is below its intrinsic value and offer a fair margin of safety; this may also require the application of technical tools to reconfirm a probable oversold condition at the time of such analysis. Conceptualization would require the investor to have at hand an investment philosophy, upon which subsequent investment decisions would be based. This philosophy would be based on an understanding of various forces which affect the stock markets and the movement of the prices of stocks traded in them. Forces would include demand supply mismatches in the stock market itself as well as in other allied markets (like commodities and forex amongst other such markets including global, regional and national) which may influence its performance, stock market psychology (an oscillation between fear and greed), political (including government policies) stability or otherwise of the nation in which the stock market exists, amongst others. In addition, the investor would also be required to segregate the stocks short listed into categories of growth, bell weathers, stars, cyclical, technology based and asset rich. Thereafter, the investor would either choose a value based or growth based approach.

In the long run, the individual investor would find that the above selection of the portfolio strategy and its subsequent implementation would be intuitive. It would

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require the individual investor to ascertain whether he has the time to take on the challenges offered by this shift from a passive portfolio strategy to an active portfolio strategy stance. If it is found that the time required for this exercise is not readily available, then the individual investor may continue to maintain the expected present stance of a passive portfolio strategy. Of course, a passive portfolio strategy stance would have the advantage of safety of the investment capital although at a lower rate of return or growth; but, then again the individual investor would have a larger investment capital base to start with, when he does get around to adopting an active portfolio strategy stance. The individual investor would also realize that selecting an appropriate portfolio strategy is but one link (or part) of what may be called the portfolio management framework. That the individual investor chooses to be cautious at all times would hold him in good stead in the long run.

The above discussed process & steps are only indicative of aspects the investor would have to consider while shifting from a passive portfolio strategy to an active portfolio strategy. But the investor would be required to document his own investment objective and investment policy; and subsequently clearly state (or select) the appropriate portfolio strategy to be adopted for subsequent investment decision making. So designing a portfolio strategy is a dynamic process & should be handled carefully.

PORTFOLIO INVESTMENT PROCESS

The ultimate aim of creating the portfolio is to reduce the risk and increase the return to the investor in order to reach the investment objectives of an investor. The manager must be aware of the investment process. The process of portfolio management involves many logical steps like portfolio planning, portfolio implementation and monitoring. The portfolio investment process applies to different situations. Portfolio is owned by different individuals and organizations with different requirements. Investors should buy when prices are very low and sell when prices rise to levels higher than their normal fluctuation.

Portfolio investment process is an important step to meet the needs and convenience of investors. The portfolio investment process involves the following steps:

1. Planning of portfolio
2. Implementation of portfolio plan.
3. Monitoring the performance of portfolio.

1) Planning of portfolio:

Planning is the most important element in a proper portfolio management. The success of the portfolio management will depend upon the careful planning. While making the plan, due consideration will be given to the investor's financial capability and current capital market situation. After taking into consideration a set of investment and speculative policies will be prepared in the written form. It is called as statement of investment policy. The document must contain:

- (1) The portfolio objective

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(2) Applicable strategies

(3) Investment and speculative constraints.

The planning document must clearly define the asset allocation. It means an optimal combination of various assets in an efficient market. The portfolio manager must keep in mind about the difference between basic pure investment portfolio and actual portfolio returns. The statement of investment policy may contain these elements. The portfolio planning comprises the following situation for its better performance:

(A) Investor Conditions: - The first question which must be answered is this – “What is the purpose of the security portfolio?” While this question might seem obvious, it is too often overlooked, giving way instead to the excitement of selecting the securities which are to be held. Understanding the purpose for trading in financial securities will help to:

- (1) Define the expected portfolio liquidation,
- (2) Aid in determining an acceptable level or risk, and
- (3) Indicate whether future consumption (liability needs) are to be paid in nominal or real money, etc.

For example: a 60 year old woman with small to moderate saving probably (1) has a short investment horizon, (2) can accept little investment risk, and (3) needs protection against short term inflation. In contrast, a young couple investing for retirement in 30 years has (1) a very long investment horizon, (2) an ability to accept moderate to large investment risk because they can diversify over time, and (3) a need for protection against long-term inflation. This suggests that the 60 year old woman should invest solely in low-default risk money market securities. The young couple could invest in many other asset classes for diversification and accept greater investment risks. In short, knowing the eventual purpose of the portfolio investment makes it possible to begin sketching out appropriate investment / speculative policies.

(B) Market Condition: - The portfolio owner must know the latest developments in the market. He may be in a position to assess the potential of future return on various capital market instruments. The investors' expectation may be two types, long term expectations and short term expectations. The most important investment decision in portfolio construction is asset allocation. Asset allocation means the investment in different financial instruments at a percentage in portfolio. Some investment strategies are static. The portfolio requires changes according to investor's needs and knowledge. A continues changes in portfolio leads to higher operating cost. Generally the potential volatility of equity and debt market is 2 to 3 years. The type of rebalancing strategy focuses on the level of prices of a given financial asset.

(C) Speculative Policies: - The portfolio owner may accept the speculative strategies in order to reach his goals of earning to maximum extant. If no

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speculative strategies are used the management of the portfolio is relatively easy. Speculative strategies may be categorized as asset allocation timing decision or security selection decision. Small investors can do by purchasing mutual funds which are indexed to a stock. Organization with large capital can employ investment management firms to make their speculative trading decisions.

- (D) Strategic Asset Allocation:** - The most important investment decision which the owner of a portfolio must make is the portfolio's asset allocation. Asset allocation refers to the percentage invested in various security classes. Security classes are simply the type of securities: (1) Money Market Investment, (2) Fixed Income obligations; (3) Equity Shares, (4) Real Estate Investment, (5) International securities.

Strategic asset allocation represents the asset allocation which would be optimal for the investor if all security prices trade at their long-term equilibrium values that is, if the markets are efficiency priced.

2) Implementation of portfolio plan

In the implementation stage, three decisions to be made, if the percentage holdings of various assets classes are currently different from the desired holdings as in the SIP, the portfolio should be rebalances to the desired SAA (Strategic Asset Allocation). If the statement of investment policy requires a pure investment strategy, this is the only thing, which is done in the implementation stage. However, many portfolio owners engage in speculative transaction in the belief that such transactions will generate excess risk-adjusted returns. Such speculative transactions are usually classified as "timing" or "selection" decisions. Timing decisions over or under weight various assets classes, industries, or economic sectors from the strategic asset allocation. Such timing decision deal with securities within a given asset class, industry group, or economic sector and attempt to determine which securities should be over or under-weighted.

- (A) Tactical Asset Allocation:** - If one believes that the price levels of certain asset classes, industry, or economic sectors are temporarily too high or too low, actual portfolio holdings should depart from the asset mix called for in the strategic asset allocation. Such timing decision is preferred to as tactical asset allocation. As noted, TAA decisions could be made across aggregate asset classes, industry classifications (steel, food), or various broad economic sectors (basic manufacturing, interest-sensitive, consumer durables).

Traditionally, most tactical assets allocation has involved timing across aggregate asset classes. For example, if equity prices are believes to be too high, one would reduce the portfolio's equity allocation and increase allocation to, say, risk-free securities. If one is indeed successful at tactical asset allocation, the abnormal returns, which would be earned, are certainly entering.

- (B) Security Selection:** - The second type of active speculation involves the selection of securities within a given assets class, industry, or economic sector. The strategic asset allocation policy would call for broad diversification

through an indexed holding of virtually all securities in the asset in the class. For example, if the total market value of HPS Corporation share currently represents 1% of all issued equity capital, than 1% of the investor's portfolio allocated to equity would be held in HPS corporation shares. The only reason to overweight or underweight particular securities in the strategic asset allocation would be to off set risks the investors' faces in other assets and liabilities outside the marketable security portfolio. Security selection, however, actively overweight and underweight holding of particular securities in the belief that they are temporarily mispriced.

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(3) Monitoring the performance of portfolio

Portfolio monitoring is a continuous and on going assessment of present portfolio and the portfolio manger shall incorporate the latest development which occurred in capital market. The portfolio manager should take into consideration of investor's preferences, capital market condition and expectations. Monitoring the portfolio is up-grading activity in asset composition to take the advantage of economic, industry and market conditions. The market conditions are depending upon the Government policy. Any change in Government policy would reflect the stock market, which in turn affects the portfolio. The continues revision of a portfolio depends upon the following factors:

1. Change in Government policy.
2. Shifting from one industry to other
3. Shifting from one company scrip to company scrip.
4. Shifting from one financial instrument to another.
5. The half yearly / yearly results of the corporate sector

Risk reduction is an important factor in portfolio. It will be achieved by a diversification of the portfolio, changes in market prices may have necessitated in asset composition. The composition has to be changed to maximize the returns to reach the goals of investor.

CORPORATE INVESTMENT & PORTFOLIO

The most critical determinant of an organization's long-term value is its ability to optimally allocate limited capital among large projects, new markets and merger and acquisition (M&A) decisions. Successful organizations make large investment and capital allocation decisions using a robust approach that analyzes each option's 'risk-return trade-off' and reflects each option's overall impact on the existing portfolio. Poor investments, on the other hand, can result in share price depression, lost market share, departure of key leadership and negative media attention. By incorporating a risk-return perspective into Corporate Portfolio Management, organizations will be better equipped to answer the following questions:

- How can risk be incorporated into the decision making process so that multiple investment options are consistently evaluated?

Check Your Progress:

1. What is financial analysis?
2. What is ratio analysis?
3. What is fund flow statement?
4. What is cash flow statement?

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- Will the expected return in any single investment justify the level of risk required to pursue this option?
- What is the optimal combination of investment options to achieve our mid- and long-term strategic objectives?
- Where should I spend my next investment dollar?

Utilizing a risk-return perspective to support these decisions will allow a firm to sustain growth and create long-term value. It can be applied to a wide variety of industry examples:

Media and technology companies determining an appropriate business portfolio amid technological uncertainty

Energy companies selecting an exploration portfolio amid political and price uncertainty

Aerospace and automotive manufacturers choosing between business segments amid demand and project execution uncertainty

Pharmaceutical companies allocating R&D dollars based on a portfolio view of their pipeline

Companies considering a make vs. buy outsourcing decision within their supply chain

Real estate companies determining the right mix of geographic vs. use combinations

While investment decisions should include the strategic concerns and management perspectives that pushed the company to initially investigate a given investment option, a risk-return quantitative analysis ensures that management will neither overpay for the potential strategic gain nor underestimate the potential risks of any new investment.

In comparison to current risk-based decision making practices, the Corporate Portfolio Management approach provides the following benefits:

Increased decision making transparency through a more consistent evaluation of all business units and options

A consistent approach to risk measurement

A systematic way of including different views of risk in decision-making process

A clear enhancement to the due diligence process

Better understanding of value creation among new investment opportunities

Consideration of the correlation and diversification effects of the organization's different businesses and investment options

Guidance for strategic planning (e.g. identification of where the company needs to move to improve its risk-return position)

Consideration of qualitative and non-financial implications

These benefits can easily be recognized across most organizations, regardless of size or industry. Our experience has shown us that a great deal of the information and expertise required by the Corporate Portfolio Management approach is already available within an organization. The key is to ensure that management understands

and continually evaluates the risk-return position of both their organization's assets and new investment opportunities to create the most value in the long-term.

CASE

Moneycorp, based in London with offices in Spain and the United States, is one of the U.K.'s leading foreign currency exchanges with more than £11 billion in annual business, wholesale and commercial foreign exchange operations. As a private company with an established reputation, Moneycorp is focused on long-term customer satisfaction with the goal to deliver the best and most comprehensive services to its customers.

With foreign currency exchange rates playing such an integral role in its business, Moneycorp needed the ability to easily send daily emails to contacts on specific currency exchange rates but couldn't efficiently achieve this with its previous system.

The Moneycorp sales team also wanted full visibility into Web tracking and previous communications sent to sales contacts, accessible to them via Microsoft Dynamics CRM, which was not possible with their previous provider, leaving Moneycorp to search for a new solution.

CASE

Marks & Spencer is Europe's most profitable retailer with a global brand and global recognition. Its achievement largely depends on the effective use of people. An organisation may have the latest technology and the best physical resources, but it will never thrive if it does not value its people. Its most valuable asset will always be its people and the work they do. For Marks & Spencer, this means that the people who look after customers, select and merchandise the products and run the operations, must aspire to be the best qualified and equipped in retailing.

Marks & Spencer's leading position in the highly competitive market-place depends on its ability to stay one step ahead of other retailers, both in the products and services on offer and how the business is organised to deliver them. As an organisation which recognises the importance of innovation, Marks & Spencer tries to nurture flexible and imaginative people. The Company needs people who are good at planning and organising, who can set objectives, establish priorities and allocate proper amounts of time to activities.

CHAPTER SUMMARY

Financial analysis (also referred to as **financial statement analysis** or **accounting analysis** or **Analysis of finance**) refers to an assessment of the viability, stability and profitability of a business, sub-business or project.

It is performed by professionals who prepare reports using ratios that make use of information taken from financial statements and other reports. These reports are usually presented to top management as one of their bases in making business decisions.

- Continue or discontinue its main operation or part of its business;

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- Make or purchase certain materials in the manufacture of its product;
- Acquire or rent/lease certain machineries and equipment in the production of its goods;
- Issue stocks or negotiate for a bank loan to increase its working capital;
- Make decisions regarding investing or lending capital;
- Other decisions that allow management to make an informed selection on various alternatives in the conduct of its business.

ANSWERS TO CHECK YOUR SELF

1. Financial statements are mainly prepared for decision making purposes.
2. The term “**accounting ratios**” is used to describe significant relationship between figures shown on a balance sheet, in a profit and loss account, in a budgetary control system or in any other part of accounting organization.
3. The funds-flow-statement is a report on changes in financial operations & flow or movements of funds during the period.
4. The cash flow statement shows how much cash comes in and goes out of the company over the quarter or the year.

TEST YOURSELF

- 1) What do you mean by Financial Analysis? Explain its nature and limitations.
- 2) What are the various parties interested in the analysis of financial statements?
- 3) Explain Ratio Analysis. What are the advantages and disadvantages of Ratios Analysis?
- 4) What do you mean by Fund Flow Statement?
- 5) Explain Cash Flow Statement. What is the procedure of preparing Cash Flow Statement?
- 6) What is the difference between funds flow statement and cash flow statement?
- 7) What is the Cost-volume-profit (CVP) analysis? Explain the applications of Cost Volume Profit (CVP) concept.
- 8) What do you mean by Break Even Analysis? Explain various advantages of Break Even Analysis.
- 9) Explain Financial Forecasting. What are the various Methods Financial forecasting?
- 10) Write a short note on:
 - i) Quick Ratio
 - ii) Capital Gearing Ratio
 - iii) Dividend Payout Ratio
 - iv) Operating Ratio
 - v) Margin of Safety

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Management accounting and introduction to controlling/budgetary controlling

Management accounting and introduction to controlling/budgetary controlling

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The Unit Include:

- Introduction
- New york times October 28, 1997
- Meaning & definitions of controlling
- Control process:
- Nature of control/characteristics of control:
- Importance of controlling
- Limitation of controlling
- Principles of effective control systems
- Necessity of control
- Objective of control
- Elements of control:
- Types of controls
- Qualities of effective control system
- Characteristics of budgetary control
- Advantage of budgetary control
- Limitations of budgetary control
- Case study
- Summary:
- Test yourself:

Learning Objectives:

After going through this chapter, you should be able to:

- Define the term management accounting
- List and describe the characteristics of management accounting.
- Discuss its techniques.
- Understand issues involved.

INTRODUCTION

We all face the fundamental economic problem of how to allocate scarce resources. This is a problem that confronts every company, every government, and us as a society. It is a problem that we each face in our families and as individuals.

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In the United States and throughout most of the world, there are institutions that facilitate this allocation of scarce resources. The New York Stock Exchange is one such institution, as is the London Stock Exchange, the Chicago Board of Trade, and all other stock, bond and commodity markets. These financial markets are sophisticated and apparently efficient mechanisms for channeling resources from investors to those companies that investors believe will use those resources most profitably.

Banks and other lending institutions also allocate scarce resources across companies, through their credit and lending decisions. Governments allocate scarce resources across segments of society. They collect taxes from companies and individuals, and allocate resources to achieve social and economic goals.

All of these institutions use **financial accounting** as a primary source of information for these allocation decisions. Investors and stock analysts review corporate financial statements prepared in accordance with **Generally Accepted Accounting Principles**. Banks review financial statements as well as projections of cash flows and financial performance. The Internal Revenue Service taxes income that is calculated only slightly differently from income for financial reporting purposes. In effect, the same set of financial accounting rules is used by these different users, with only minor modifications.

However, this is only part of the story, because when I buy stock in Microsoft, whether my investment turns out to be profitable depends largely on the operational, marketing and strategic decisions that Microsoft's managers make during the time that I hold my investment. And when Microsoft's management team sits down to decide what products to develop, which markets to enter, and how to source production, they are not, almost certainly, looking at the company's most recent annual report or any other financial accounting report. By the time the annual report is available, the information is too old, and in any case, it is too highly summarized; there is not enough detail and not enough forward-looking data. Rather, when Microsoft's management team makes decisions, it bases these decisions on **management accounting** information. This is definitional. *By definition, management accounting is the information that managers use for decision-making. By definition, financial accounting is information provided to external users.*

Hence, both financial accounting and management accounting are all about allocating scarce resources. Financial accounting is the principle source of information for decisions of how to allocate resources among companies, and management accounting is the principle source of information for decisions of how to allocate resources within a company. Management accounting provides information that helps managers control activities within the firm, and to decide what products to sell, where to sell them, how to source those products, and which managers to entrust with the company's resources.

In other news, General Motors' common stock rose \$1.10 today following the announcement that the company has successfully installed an improved management accounting system.

Management accounting
and introduction to
controlling/budgetary
controlling

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If management accounting so important, why are we not likely to see a headline like the fictional announcement shown above? There are two reasons. First, management accounting information is proprietary; public companies are generally not required to disclose management accounting data nor much detail about the systems that generate this information. Typically, companies disclose very little management accounting information to investors and analysts beyond what is imbedded in financial reporting requirements. Even very basic information, such as unit sales by major product category, or product costs by product type, is seldom reported, and when it is reported one can be sure that management believes voluntary disclosure of this information will be viewed as "good news" by the marketplace.

The second reason we are not likely to see a headline like the one above is that most management accounting systems seem to work reasonably well most of the time. Hence, it is difficult for a company to gain a competitive advantage by installing a better management accounting system than its competitors. However, this observation does not imply that management accounting systems are not important. On the contrary, as the following news story indicates, poor management accounting systems can significantly affect the investment community's perception of a company's prospects.

NEW YORK TIMES

OCTOBER 28, 1997

Oxford Health Plans said yesterday that it had been losing money because it fell behind in sending bills to customers and underestimated how much it owed doctors and hospitals. Shares fell 62%. Stephen Wiggins, chairman of Oxford, said the company had belatedly discovered that many customers were not paying premiums, often because the company was late in sending bills.

Oxford acknowledged that it had fallen behind in payments to hospitals and doctors as it struggled with a new computer system. With incomplete information in its computers, it had to advance money to doctors and hospitals without verifying that they were obeying Oxford's rules. Mr. Wiggins said Oxford would add about 0.5% to spending on administration next year in an effort to insure there are no similar problems. "The important thing," he added, "is we're the same company we were on Friday, except our market value has dropped by half."

Health insurance is a relatively stable industry. 1997 was the middle of a strong bull market. What was the problem with Oxford such that in this environment it should lose half its stock value almost overnight? The answer is that its management accounting system was broken, big time. Management accounting is something like

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indoor plumbing. When it functions properly, we tend to take it for granted, but when it breaks down, we quickly develop a greater appreciation for it.

Definition and Scope of Management Accounting:

Management accounting is the process of measuring and reporting information about economic activity within organizations, for use by managers in planning, performance evaluation, and operational control:

- **Planning:** For example, deciding what products to make, and where and when to make them. Determining the materials, labor, and other resources that are needed to achieve desired output. In not-for-profit organizations, deciding which programs to fund.
- **Performance evaluation:** Evaluating the profitability of individual products and product lines. Determining the relative contribution of different managers and different parts of the organization. In not-for-profit organizations, evaluating the effectiveness of managers, departments and programs.
- **Operational control:** For example, knowing how much work-in-process is on the factory floor, and at what stages of completion, to assist the line manager in identifying bottlenecks and maintaining a smooth flow of production.

Also, the management accounting system usually feeds into the financial accounting system. In particular, the product costing system is usually used to help determine inventory balance sheet amounts, and the cost of sales for the income statement.

Management accounting information is usually financial in nature and dollar-denominated, although increasingly, management accounting systems collect and report nonfinancial information as well.

The mechanical process of collecting and processing information poses substantial and interesting challenges to large organizations. Also, there are important conceptual issues about how to aggregate information in order to measure, report, and analyze costs. Issues of how to allocate costs across products, services, customers, subunits of the organization, and time periods, raise questions of substantial intellectual content, to which there are often no clear answers.

Management accounting is used by businesses, not-for-profit organizations, government, and individuals:

- **Businesses** can be categorized by the sector of the economy in which they operate. Manufacturing firms turn raw materials into finished goods, and we also include in this category agricultural and natural resource companies. Merchandising firms buy finished goods for resale. Service sector companies sell services such as legal advice, hairstyling and cable television, and carry little if any inventory. Businesses can also be categorized by their legal structure: corporation, partnership, proprietorship. Finally, businesses can be categorized by their size.

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- Not-for-profit organizations include charitable organizations, not-for-profit health care providers, credit unions, and most private institutions of higher education.
- Government includes Federal, state and local governments, and governmental agencies such as the post office and N.A.S.A.

All of these organizations use management accounting extensively. Also, individuals use the economic concepts that form the foundation of management accounting in their personal lives, to assist in decisions large and small: home and automobile purchases, retirement planning, and splitting the cost of a vacation rental with friends.

Controlling is a fundamental managerial function. It is the process of comparing actual performance with established standards, for the purpose of taking action to correct the deviations if any. It is the process by which managers ensure that resources are obtained and used effectively and efficiently in the accomplishment of the organization's objective. The basic purpose of a well designed control system is to ensure that results are achieved according to plan. Controlling is a continuous process of measuring actual results of operation of an organization, and compares it to the standards and takes corrective actions if necessary.

Management accounting or managerial accounting is concerned with the provisions and use of accounting information to managers within organizations, to provide them with the basis to make informed business decisions that will allow them to be better equipped in their management and control functions.

In contrast to financial accountancy information, management accounting information is:

- primarily forward-looking, instead of historical
- model based with a degree of abstraction to support decision making generically, instead of case based;
- designed and intended for use by managers within the organization, instead of being intended for use by shareholders, creditors, and public regulators;
- usually confidential and used by management, instead of publicly reported;
- Computed by reference to the needs of managers, often using management information systems, instead of by reference to general financial accounting standards.

MEANING & DEFINITIONS OF CONTROLLING

Controlling is the process through which managers ensure that actual activities conform to the planned activities. Some of the definitions of controlling are as follows:

According to George R. Terry, "Controlling is determining what is being accomplished, that is, evaluating the performance and, if necessary, applying corrective measures so that the performance takes place according to plans."

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According to Kountz O' Donnel, "Management control implies measurement of accomplishment against the standards and the correction of deviations to ensure attainment of objectives according to plans."

According to E.F.L. Brech, "Controlling is checking current performance against pre-determined standards contained in the plans with a view to ensure adequate progress and satisfactory performance."

On the basis of above definitions, it may be concluded that the control is a process through which the performance of subordinates is evaluated to see whether the activities of the organization are going on in the required manner or not. Whether the employees of the organization are doing their jobs according to the orders and directions issued to them or not. If anything is found wrong, remedial measures are taken for that so that the activities of the organization may go on in the right way and in the right direction.

CONTROL PROCESS:

The control process involves the following basic steps

1. Setting objectives
2. Establishing standards
3. Measuring performance
4. Appraisal of performance
5. Correcting deviation

Process of Control

1. **Setting objectives:** The first step in control process is the setting of objective. The objectives must be clearly specified and understood. The objective should be specific as well as meaningful.
2. **Establishing standards:** Standards are the targets against which subsequent performance will be compared. They are yardsticks of performance and specify what should be accomplished. To make the standards effective they must have the following features:-
 - a. Standards should be set in quantitative terms to the maximum possible extent.
 - b. Standards should concentrate on results and not on procedures.
 - c. Standards should be revised periodically to keep them updated.
 - d. Standards should be accurate and flexible.
3. **Measuring performance:** Once the standards and objectives have been established, the next step in the controlling process is to monitor and measure the actual performance. Monitoring and measurement is a continuous activity and involves collection of data that represent the actual performance of the activity so that a comparison can be made between what is accomplished

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and what was intended to be accomplished. The manager while comparing the performance with the standards has to find out not only the extent of variation but also the causes of variation. Measurement of performance should be accurate and reliable. It should be simple & clear. Where quality standard are established performance should be measured in quantitative terms.

4. **Appraisal of performance:** The comparing step determines the degree of variation between actual performance and the standards. Comparison of actual performance with the planned target or standards involves two steps i.e. finding the extent of deviation and identifying the causes of deviation. If performance matches the standards managers may assume that every thing is under control. If performance falls short of standards, managers must find out the extent of deviation. This deviation may be due to error in planning, defective implementation or careless operative performance.
5. **Correcting deviation:** The Manager after finding out the deviation from the prescribed standards has to take steps to correct the deviation. The corrective action may involve a change in methods, rules, procedures etc. Sometimes variation may occur due to setting of unrealistic standards. That is, the objective may be too high or too low.

NATURE OF CONTROL /CHARACTERISTICS OF CONTROL:

- 1) **Controlling is a dynamic/Continuous process:** Controlling involves continuous review of actual performance and taking corrective actions, if required.
- 2) **Control is a function of management:** Control is a follow-up action to the other function of management. This function is performed by all the managers in the organization.
- 3) **Control is action oriented:** A good system of control facilities timely actions so that there is minimum waste of resources, time and energy.
- 4) **Control leads to post mortem of past events:** Control leads to appraisal of past activities. The shortcomings in the performance of various individuals and departments are revealed by the control process. It helps in knowing the reasons of poor performance.
- 5) **Control is forward looking:** Control is forward looking. It is related to future, as past cannot be controlled. It is usually a preventive technique as the presence of control systems leads to minimize wastage, losses and deviations from standards.
- 6) **Essential at every Level of Management:** Controlling is not a specific function to be performed at any specific level of management. It is required at every level of management for all the activities and all the departments.

- 7) **Attainment of Goals:** The main object of control is to ensure the proper functioning of the organization according to the pre-decided rules, policies, plans, procedures and programmes. It aims at the attainment of pre-decided objective of the organization.

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IMPORTANCE OF CONTROLLING

Controlling helps to ensure that objectives and accomplishments are consistent with one another throughout an organization. The importance of controlling function of management may be described as follows:-

- 1) **Control facilitates decision making:** Controlling helps managers to identify the gaps between thinking and doing functions of management. It helps to find out the problems in performance and to take appropriate decisions to cure these problems.
- 2) **Control facilitates decentralization:** Control enables the top management to get the feedback which helps them to ensure that the decision taken at the lower levels are consistent with the policies and the interest of the organization.
- 3) **Control ensures proper implementation of plans:** Planning provides purpose and direction to organizational activities and controlling is the process of checking current performance against pre-determined standards contained in the plans, with a view to ensure satisfactory performance.
- 4) **Control helps in co-ordination:** Controlling facilitates the work of co-ordination, this is possible by keeping all the activities and efforts directed towards the achievement of goals in conformity with plans and programmes.
- 5) **Control improves employee's morale:** Controlling creates an atmosphere of order and discipline in the organization. Employees know well in advance what they are expected to do and the standards against which their performance will be judged. It induces them to do things in a proper manner. It increases the morale of employees to perform well.

LIMITATION OF CONTROLLING

- 1) **External factors:** The management cannot contract external factors which may affect performance because they are beyond the control of management. For example: Government action, market forces etc.
- 2) **Difficulty in setting standards:** The determination of standards is very essential for control. These are many things like production, quality etc that can be standardized either in physical or financial terms but there are some activities, which cannot be subjected to any scientific or accurate measurement.
- 3) **Responsibility cannot be fixed:** In organization there are a number of deviations for which nobody in particular can be held responsible like in an organization we can't blame anyone for the failure of machinery during production.

- 4) **Oppositions by Subordinates:** Generally, it has been the experience the subordinates oppose the system of control because they feel that it will increase the burden of work upon them.
- 5) **Expensive:** The process of control is sometimes so expensive that the benefits of this process are less than the expenses incurred on it. Modern techniques of control are very expensive. It is suitable for the large scale business and industrial enterprises.

PRINCIPLES OF EFFECTIVE CONTROL SYSTEMS

There are certain principles of effective control systems. There are as follows:

- 1) **Need & nature of activity:** The control system should meet the need and nature of activity. For example: Control system used in the finance department will naturally differ from the production or the sales department. Similarly, need & nature of small business is different from the big business.
- 2) **Prompt report of deviations:** The control system should enable subordinates to inform their superiors in time about their performance, this would help the superiors in detecting deviation and in taking prompt corrective actions.
- 3) **Forward looking control:** A good control system is one that detects deviation early enough so as to enable the managers to take quick corrective actions.
- 4) **Objective standards:** Objectives provide control standards against which actual performance can be evaluated. So objective standard should be definite and clear.
- 5) **Flexible Control:** The plans and objective may change according to the needs of the situation; therefore control system should be flexible so that it can be adjusted to suit the needs of any modification or alteration in the plans and objectives.
- 6) **Economical Control:** The control system should be economical. The benefit derived by the business concern from the control system should be more than the cost involved in its maintenance.
- 7) **Corrective Action:** The control system should not only detect deviation from the pre-determined standards but also should provide solutions to the problems that are responsible for deviation. In the words of Koontz & O' Donnell, "An adequate system should disclose where failures are occurring who is responsible for them and what should be done about them."
- 8) **Simple control:** To be effective, Control must be simple and easily understandable to the managers as well as subordinates.

NECESSITY OF CONTROL

A control system is needed for three purposes:-

- 1) To measure progress

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- 2) To uncover deviation and
- 3) To indicate corrective action
- 1) **To measure progress:** The Control process measures progress towards the goals of the company. The manager of the concern measures the undertaking of the enterprises or department, whether all the activities of the enterprise are in planned course or not.
- 2) **To uncover deviation:** The control process helps to uncover or expose the deviation of the concern by comparing actual performance to the pre-determined standards. A successful control process is one that takes corrections to the organization before the deviations become serious.
- 3) **To indicate Corrective Action:** A control system is needed to indicate the corrective actions. Control system may reveal all the facts that are needed to be redrawn, for example plans need to be redrawn or there is need for reassignment or clarification of duties.

OBJECTIVE OF CONTROL

Following are the important objectives of control:-

- Control aims the measurement of actual performance.
- Control aims to identify the variations, if any.
- Control aims to rectify the variation and prevent their recurrence.
- Control aims that the problems and hindrances may not repeat.

In brief, the main object of control is to get the work done by a manager from his subordinates according to the pre-determined standards. If any difficulty or problem arises in the performance of the work, best efforts are made to solve the problems so that the work may go on the required manner and pre-determined objectives of the enterprise may be achieved easily.

ELEMENTS OF CONTROL:

Following are the four basic elements of control:

- 1) **The Characteristic or condition to be controlled:** The first element is the characteristic or condition of the operating system which is to be measured.
- 2) **The sensor:** The second element of control is the sensor. It is a means for measuring the characteristic or conditions.
- 3) **The comparator:** The third element of control is the comparator. It determines the need for correction by comparing what is occurring with what has been planned.
- 4) **The Activator:** The activator is the fourth element of control. It is the corrective action taken to return the system to expected output.

TYPES OF CONTROLS

Control can focus on events before, during, or after a process. For example, a local automobile dealer can focus on activities before, during, or after sales of new cars. Careful inspection of new cars and cautious selection of sales employees are the ways to ensure high quality or profitable sales even before those sales take place. Monitoring how salespeople act with customers is a control during the sales task. Counting the number of new cars sold during the month and telephoning buyers about their satisfaction with sales transactions are controls after sales have occurred. These types of controls are formally called **feed forward, concurrent, and feedback**, respectively.

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1) Feed forward controls:

These controls are sometimes called preliminary or preventive controls, attempt to identify and prevent deviations in the standards before they occur. Feed forward controls focus on human, material, and financial resources within the organization. These controls are evident in the selection and hiring of new employees. For example, organizations attempt to improve the likelihood that employees will perform up to standards by identifying the necessary job skills and by using tests and other screening devices to hire people with those skills.

2) Concurrent controls:

These controls monitor ongoing employee activity to ensure consistency with quality standards. These controls rely on performance standards, rules, and regulations for guiding employee tasks and behaviors. Their purpose is to ensure that work activities produce the desired results. As an example, many manufacturing operations include devices that measure whether the items being produced meet quality standards. Employees monitor the measurements; if they see that standards are not being met in some area, they make a correction themselves or let a manager know that a problem is occurring.

3) Feedback controls:

These involve reviewing information to determine whether performance meets established standards. For example, suppose that an organization establishes a goal of increasing its profit by 12 percent next year. To ensure that this goal is reached, the organization must monitor its profit on a monthly basis. After three months, if profit has increased by 3 percent, management might assume that plans are going according to schedule.

QUALITIES OF EFFECTIVE CONTROL SYSTEM

BUDGETING OR BUDGETARY CONTROL:

A budget is a financial or quantitative statement prepared for a definite period of time. It provides standards for comparison with the results actually achieved.

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According to George R. Terry, "Budget is an estimate of future needs arranged to an orderly basis covering some or all of the activities of an enterprise for a definite period of time."

According to Prof. Larders, "The essence of a budget is a detailed plan of preparations for some specified future period, followed by a system of records which will serve as a check upon the plan."

Budgetary control is a process in which the actual performance of an organization is compared with the forecasts decided through different budgets prepared in advance.

According to George R. Terry, "Budgetary control may be described as a process of finding out what's being done and comparing actual results with the corresponding budgetary data in order to approve accomplishments or to remedy the differences be either adjusting the budget estimates or correcting the cause of differences."

According to S. Batty, "Budgetary control is a system which uses budgets as a means of planning and controlling all aspects of producing and selling commodities or services."

On the basis of above definitions, it may be concluded that in this process, different budgets are prepared in the organization, actual performance is recorded and compared with budgetary forecasts. On the basis of this comparison, the variance between the actual performance and the budgetary forecasts are determined and all the possible efforts are made to remove these variances so that the organization may achieve the pre-determined forecasts and targets.

Budgeting is the process of preparing budget whereas budgetary control is a device or technique of managerial control through budgets. Thus budgetary control is planning in advance of the various aspects of business that can be controlled.

CLASSIFICATION OF BUDGETS

Activity-based budget is the budget for the costs of individual activities. In activity-based budgeting, all costs are allocated to cost centers and then are assigned to activities. Products or customers are allocated the costs based on the amount of activity they consume. Activity-based budgets ensure cost reduction and performance improvement. As activity-based budgeting requires a new budgeting model, it requires careful planning and implementation.

Add-on budget is the budget based on the previous years' budgets adjusted for current information. For example, add-on budgets can be adjusted for new levels of inflation, employee wage rates, or new requirements.

Bracket budget is the budget at higher and lower levels than the base estimate. Essentially bracket budgets are contingency expense plans for downside risks. For example, such budgets allow management to estimate an impact of decreased sales on earnings. In bracket budgeting, management identifies potential problems and acceptable profit. In this way, management can test different alternatives and improve planning process.

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Continuous (rolling) budget is the budget revised on a regular basis. As the period ends, a new budget period is added. For example, the budget can be regularly extended for another month (or quarter) at the end of each month (or quarter). As the result, continuous budgets are based on the most recent information and ensure proper planning and performance. The drawback of continuous budgets is that they require continuous planning.

Incremental budget is the budget adjusted for incremental increases in terms of dollars or percentages. Historically incremental budgeting has been the most common budgeting method. It is based on the prior's year expenditures. In incremental budgeting, each budget line receives the same increment (e.g., 10% percent) increase or decrease for the next budget cycle. Projects can also be segregated in multiple increments, and each increment is then allocated labor and other resources to complete the project. Incremental budget are easy to prepare. However, they have multiple drawbacks. Incremental budgets are based on aggregate data. They might not match company's targets. Incremental budgets can potentially cause over- or underfunding of certain areas.

Strategic budget is the budget adjusted for strategic planning. Strategic budgets are used under conditions of uncertainty or instability. Strategic budgeting is the mixture between the top-down approach – when top management allocates resources – and the bottom-up approach – when lower management participates in resource allocation.

Stretch budget is the budget based on sales and marketing forecasts that are higher than estimates. Stretch budgets are not used for estimating expenditures; expenses are estimated at the budget target. Stretch budgets can be too subjective or complex.

Supplemental budget is the budget for an area that is not included in the main (base) budget.

Target budget is the budget that matches major expenditures to company's goals.

CHARACTERISTICS OF BUDGETARY CONTROL

The characteristics of the budgetary control may be explained as follows:

- 1) In this process, financial forecast are made by the organization for a certain performance.
- 2) In this process, different budgets are prepared for all the departments and the sub-departments of the organization and then master budget is prepared for the whole organization.
- 3) Actual performance of all the departments and sub-departments is recorded.
- 4) Actual performance is compared with the budgetary forecasts.
- 5) On the basis of this comparison, variance between actual performance and budgetary forecasts are located and noted.
- 6) The efforts are made to locate the reasons for these variances.

- 7) Best efforts are made to remove unfavorable variances.

OBJECTIVES OF BUDGETARY CONTROL

The objectives of the budgetary control are as follows:

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- 1) To establish effective control over all the activities of the enterprise for the attainment of pre-determined objectives.
- 2) To bring certainty in the planning process of the management.
- 3) To develop the best possible organizational structure and best possible system of management in the enterprise.
- 4) To remove the defect of over capitalization or under capitalization in the enterprise.
- 5) To arrange adequate finance for the enterprise.
- 6) To ensure the best possible utilization of the available resources of the enterprise.
- 7) To ensure the implementation of policies, plans and programmes of the enterprise.
- 8) To establish co-ordination and co-operation among different employees and officers of the enterprise.
- 9) To maintain effective balance among the activities of different departments of the enterprise.
- 10) To adjust the internal organizational structure of the enterprise in accordance with the external situations.

ADVANTAGE OF BUDGETARY CONTROL

Some of the important advantages of budgetary control are as follows:-

- 1) Budgetary control helps in finding out the deviations from the pre-determined standards and by this the management becomes enabling to take suitable corrective action promptly.
- 2) Budgetary control tries to keep the expenditure within control and also to achieve the targets laid down. This keeps everybody always alert and encourages the optimum use of organizational resources.
- 3) Budgetary control is concerned with the activities of various departments which are inter-related. This may help in promoting of co-operation and team spirit among the employees of the different department.
- 4) Budgetary control involves two functions planning for its own future performance and control to ensure proper performance.
- 5) Budgetary control makes the valuation of business events in monetary terms. It increase the reliability of the planning process of the enterprise.

LIMITATIONS OF BUDGETARY CONTROL

These are following limitation of budgetary control-

- 1) Budgets are based on estimates and hence the effectiveness of budgetary control depends on the accuracy with which the estimates are made.
- 2) It is very difficult to attain flexibility in budget making.
- 3) Budgetary control programme is a very time consuming process.
- 4) Budgetary control will not be effective if no arrangements are made for proper supervision and administration.
- 5) In the system of budgetary control, budgets are prepared for future and future is always uncertain.
- 6) The system of budgetary control can be successful only when the heads of different departments co-operate with each other.
- 7) Budgetary control system considers only those factors which can be measured in terms of money.

CASE STUDY

Professor Sudhir Tyagi of Meerut University, in a paper presented at the fifth Anniversary Conference of the Meerut Institute for Advanced Studies in Management, presented four revisions to traditional Management Theory. In summary, the revisions are:

- (1) The initiative for the renewal and adjustment of the activities of a firm should come from the different levels in the management hierarchy. "Strategy is not a privilege of top management".
- (2) Firms, especially big firms, are incoherent systems (goals of the different component systems are not simply subdivisions of an overall goal; there are individual, conflicting goals as well). Some of these differences are manifestations of organizational initiative and vitality. Using information systems and central planning and rule making to suppress all differences is destructive to organizations.
- (3) The most vital "fluid" of an enterprise is the aggregate of its entrepreneurial values. The most fundamental and motivation and control come through these shared values relative to work, quality, efficiency, etc. Management often neglects these values and assumes that the collection and dissemination of information will provide sufficient motivation and control.
- (4) Enterprises are open systems; their structure and operating processes are determined by their environment. This means organizations must be designed to continually adjust to the environment.

SUMMARY:

- Controlling is the process through which managers ensure that actual activities conform to the planned activities.

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Check Your Progress:

1. What is controlling?
2. Controlling system is _____.
3. Define four basic elements of control.
4. What is budgetary control?

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- **Control Process:** Setting Objectives, Establishing Standards, Measuring performance, Appraisal of Performance, Correcting deviations.
- **Nature of Control:** Controlling is a continuous process, Control is action oriented, Control is the function of management, Control is forward looking, Control is the post-mortem of past events, Essential at every level of management, Attainment of goals.
- **Importance of Controlling:** Control facilitates decision making, Control facilitates Decentralization, Control ensures proper implementation of plans, control helps in co-ordination, and control improves employee's morale.
- **Principles of effective control system:** Need and nature of activity, Prompt report of deviations, Forward looking control, objective standards, Flexible control, Economical control, corrective actions, Simple control.
- **Elements of Control:** Condition. Sensor, Comparator, Activator.
- **Types of Control;** Feed Forward Controls, Concurrent Controls, Feedback Controls.
- **Budget is a financial or quantitative statement prepared for a definite period of time.**
- **Budgeting is the process of preparing budget whereas budgetary control is a device or technique of managerial control through budgets.**

ANSWERS TO 'CHECK YOUR PROGRESS'

1. Controlling is the process through which managers ensure that actual activities confirm to the planned activities.
2. A control system is needed for three purposes: to measure progress, to uncover deviation and to indicate corrective action.
3. Four basic elements of Control: condition, sensor, comparator, and activator.
4. Budgetary control is a system which uses budgets as a means of planning and controlling all aspects of producing and selling commodities or services.

TEST YOURSELF :

1. Define control. Explain the process of Control.
2. Describe the characteristics and importance of Control.
3. What are the principles of effective control systems?
4. Briefly explain the types of Control.
5. What do you mean by Budgetary Control?
6. Explain advantages and disadvantages of Budgetary Control.

5

Break Even Analysis and Cost Volume Profit Analysis

Break Even Analysis and
Cost Volume Profit
Analysis

NOTES

The Unit Include:

- Introduction
- Marginal Costs, Contribution and Profit
- Cost-Volume-Profit (C-V-P) Relationship
- Objectives of Cost-Volume-Profit Analysis
- Assumptions and Terminology
- Limitations of Cost-Volume Profit Analysis
- Sensitivity Analysis or What If Analysis and Uncertainty
- Marginal Cost Equations and Breakeven Analysis
- Construction of a Breakeven Chart
- Multiple Product Situations
- Breakeven Point in Sales Revenue
- Cost Volume Profit Analysis
- Cost Audit
- Objectives
- Case

Learning Objectives:

After going through this chapter, you should be able to:

- To describe as to how the concepts of fixed and variable costs are used in C-V-P analysis
- To segregate semi-variable expenses in C-V-P analysis
- To identify the limiting assumptions of C-V-P analysis
- To work out the breakeven analysis, contribution analysis and margin of safety
- To understand how to draw a breakeven chart
- To compute breakeven point

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Introduction

In this lesson, we will discuss in detail the highlights associated with cost function and cost relations with the production and distribution system of an economic entity.

To assist planning and decision making, management should know not only the budgeted profit, but also:

- the output and sales level at which there would neither profit nor loss (break-even point)
- the amount by which actual sales can fall below the budgeted sales level, without a loss being incurred (the margin of safety)

MARGINAL COSTS, CONTRIBUTION AND PROFIT

A marginal cost is another term for a variable cost. The term 'marginal cost' is usually applied to the variable cost of a unit of product or service, whereas the term 'variable cost' is more commonly applied to resource costs, such as the cost of materials and labor hours.

Marginal costing is a form of management accounting based on the distinction between:

- a. the marginal costs of making selling goods or services, and
- b. fixed costs, which should be the same for a given period of time, regardless of the level of activity in the period.

Suppose that a firm makes and sells a single product that has a marginal cost of £5 per unit and that sells for £9 per unit. For every additional unit of the product that is made and sold, the firm will incur an extra cost of £5 and receive income of £9. The net gain will be £4 per additional unit. This net gain per unit, the difference between the sales price per unit and the marginal cost per unit, is called contribution.

Contribution is a term meaning 'making a contribution towards covering fixed costs and making a profit'. Before a firm can make a profit in any period, it must first of all cover its fixed costs. Breakeven is where total sales revenue for a period just covers fixed costs, leaving neither profit nor loss. For every unit sold in excess of the breakeven point, profit will increase by the amount of the contribution per unit.

C-V-P analysis is broadly known as cost-volume-profit analysis. Specifically speaking, we all are concerned with in-depth analysis and application of CVP in practical world of industry management.

Cost-Volume-Profit (C-V-P) Relationship

We have observed that in marginal costing, marginal cost varies directly with the volume of production or output. On the other hand, fixed cost remains unaltered regardless of the volume of output within the scale of production already fixed by management. In

case if cost behavior is related to sales income, it shows cost-volume-profit relationship. In net effect, if volume is changed, variable cost varies as per the change in volume. In this case, selling price remains fixed, fixed remains fixed and then there is a change in profit.

Being a manager, you constantly strive to relate these elements in order to achieve the maximum profit. Apart from profit projection, the concept of Cost-Volume-Profit (CVP) is relevant to virtually all decision-making areas, particularly in the short run.

The relationship among cost, revenue and profit at different levels may be expressed in graphs such as breakeven charts, profit volume graphs, or in various statement forms.

Profit depends on a large number of factors, most important of which are the cost of manufacturing and the volume of sales. Both these factors are interdependent. Volume of sales depends upon the volume of production and market forces which in turn is related to costs. Management has no control over market. In order to achieve certain level of profitability, it has to exercise control and management of costs, mainly variable cost. This is because fixed cost is a non-controllable cost. But then, cost is based on the following factors:

- Volume of production
- Product mix
- Internal efficiency and the productivity of the factors of production
- Methods of production and technology
- Size of batches
- Size of plant

Thus, one can say that cost-volume-profit analysis furnishes the complete picture of the profit structure. This enables management to distinguish among the effect of sales, fluctuations in volume and the results of changes in price of product/services.

In other words, CVP is a management accounting tool that expresses relationship among sale volume, cost and profit. CVP can be used in the form of a graph or an equation. Cost-volume- profit analysis can answer a number of analytical questions. Some of the questions are as follows:

1. What is the breakeven revenue of an organization?
2. How much revenue does an organization need to achieve a budgeted profit?
3. What level of price change affects the achievement of budgeted profit?
4. What is the effect of cost changes on the profitability of an operation?

Cost-volume-profit analysis can also answer many other “what if” type of questions.

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Cost-volume-profit analysis is one of the important techniques of cost and management accounting. Although it is a simple yet a powerful tool for planning of profits and therefore, of commercial operations. It provides an answer to "what if" theme by telling the volume required to produce.

Following are the three approaches to a CVP analysis:

- Cost and revenue equations
- Contribution margin
- Profit graph

Objectives of Cost-Volume-Profit Analysis

1. In order to forecast profits accurately, it is essential to ascertain the relationship between cost and profit on one hand and volume on the other.
2. Cost-volume-profit analysis is helpful in setting up flexible budget which indicates cost at various levels of activities.
3. Cost-volume-profit analysis assist in evaluating performance for the purpose of control.
4. Such analysis may assist management in formulating pricing policies by projecting the effect of different price structures on cost and profit.

Assumptions and Terminology

Following are the assumptions on which the theory of CVP is based:

1. The changes in the level of various revenue and costs arise only because of the changes in the number of product (or service) units produced and sold, e.g., the number of television sets produced and sold by Sigma Corporation. The number of output (units) to be sold is the only revenue and cost driver. Just as a cost driver is any factor that affects costs, a revenue driver is any factor that affects revenue.
2. Total costs can be divided into a fixed component and a component that is variable with respect to the level of output. Variable costs include the following:
 - Direct materials
 - Direct labor
 - Direct chargeable expenses

Variable overheads include the following:

- Variable part of factory overheads

- Administration overheads
 - Selling and distribution overheads
3. There is linear relationship between revenue and cost.
 4. When put in a graph, the behavior of total revenue and cost is linear (straight line), i.e. $Y = mx + C$ holds good which is the equation of a straight line.
 5. The unit selling price, unit variable costs and fixed costs are constant.
 6. The theory of CVP is based upon the production of a single product. However, of late, management accountants are functioning to give a theoretical and a practical approach to multi-product CVP analysis.
 7. The analysis either covers a single product or assumes that the sales mix sold in case of multiple products will remain constant as the level of total units sold changes.
 8. All revenue and cost can be added and compared without taking into account the time value of money.
 9. The theory of CVP is based on the technology that remains constant.
 10. The theory of price elasticity is not taken into consideration.

Many companies, and divisions and sub-divisions of companies in industries such as airlines, automobiles, chemicals, plastics and semiconductors have found the simple CVP relationships to be helpful in the following areas:

- Strategic and long-range planning decisions
- Decisions about product features and pricing

In real world, simple assumptions described above may not hold good. The theory of CVP can be tailored for individual industries depending upon the nature and peculiarities of the same.

For example, predicting total revenue and total cost may require multiple revenue drivers and multiple cost drivers. Some of the multiple revenue drivers are as follows:

- Number of output units
- Number of customer visits made for sales
- Number of advertisements placed

Some of the multiple cost drivers are as follows:

- Number of units produced
- Number of batches in which units are produced

NOTES

Check your progress

1. Marginal cost is another term for _____
2. One of the important techniques of cost and management accounting is _____

NOTES

Managers and management accountants, however, should always assess whether the simplified CVP relationships generate sufficiently accurate information for predictions of how total revenue and total cost would behave. However, one may come across different complex situations to which the theory of CVP would rightly be applicable in order to help managers to take appropriate decisions under different situations.

Limitations of Cost-Volume Profit Analysis

The CVP analysis is generally made under certain limitations and with certain assumed conditions, some of which may not occur in practice. Following are the main limitations and assumptions in the cost-volume-profit analysis:

1. It is assumed that the production facilities anticipated for the purpose of cost-volume-profit analysis do not undergo any change. Such analysis gives misleading results if expansion or reduction of capacity takes place.
2. In case where a variety of products with varying margins of profit are manufactured, it is difficult to forecast with reasonable accuracy the volume of sales mix which would optimize the profit.
3. The analysis will be correct only if input price and selling price remain fairly constant which in reality is difficulty to find. Thus, if a cost reduction program is undertaken or selling price is changed, the relationship between cost and profit will not be accurately depicted.
4. In cost-volume-profit analysis, it is assumed that variable costs are perfectly and completely variable at all levels of activity and fixed cost remains constant throughout the range of volume being considered. However, such situations may not arise in practical situations.
5. It is assumed that the changes in opening and closing inventories are not significant, though sometimes they may be significant.
6. Inventories are valued at variable cost and fixed cost is treated as period cost. Therefore, closing stock carried over to the next financial year does not contain any component of fixed cost. Inventory should be valued at full cost in reality.

Sensitivity Analysis or What If Analysis and Uncertainty

Sensitivity analysis is relatively a new term in management accounting. It is a "what if" technique that managers use to examine how a result will change if the original predicted data are not achieved or if an underlying assumption changes.

In the context of CVP analysis, sensitivity analysis answers the following questions:

- a. What will be the operating income if units sold decrease by 15% from original prediction?
- b. What will be the operating income if variable cost per unit increases by 20%?

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The sensitivity of operating income to various possible outcomes broadens the perspective of management regarding what might actually occur before making cost commitments.

A spreadsheet can be used to conduct CVP-based sensitivity analysis in a systematic and efficient way. With the help of a spreadsheet, this analysis can be easily conducted to examine the effect and interaction of changes in selling prices, variable cost per unit, fixed costs and target operating incomes.

Example

Following is the spreadsheet of ABC Ltd.,

Statement showing CVP Analysis for Dolphy Software Ltd.

Fixed cost	Variable cost per unit	Revenue required at \$. 200 Selling Price per unit to earn Operating Income of			
		0	1,000	1,500	2,000
2,000	100	4,000	6,000	7,000	8,000
	120	5,000	7,500	8,750	10,000
	140	6,667	10,000	11,667	13,333
2,500	100	5,000	7,000	8,000	9,000
	120	6,250	8,750	10,000	11,250
	140	8,333	11,667	13,333	15,000
3,000	100	6,000	8,000	9,000	10,000
	120	7,500	10,000	11,250	12,500
	140	10,000	13,333	15,000	16,667

From the above example, one can immediately see the revenue that needs to be generated to reach a particular operating income level, given alternative levels of fixed costs and variable costs per unit. For example, revenue of \$. 6,000 (30 units @ \$. 200 each) is required to earn an operating income of \$. 1,000 if fixed cost is \$. 2,000 and variable cost per unit is \$. 100. You can also use exhibit 3-4 to assess what revenue the company needs to breakeven (earn operating income of Re. 0) if, for example, one of the following changes takes place:

- The booth rental at the ABC convention raises to \$. 3,000 (thus increasing fixed cost to \$. 3,000)
- The software suppliers raise their price to \$. 140 per unit (thus increasing variable costs to \$. 140)

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An aspect of sensitivity analysis is the margin of safety which is the amount of budgeted revenue over and above breakeven revenue. The margin of safety is sales quantity minus breakeven quantity. It is expressed in units. The margin of safety answers the "what if" questions, e.g., if budgeted revenue are above breakeven and start dropping, how far can they fall below budget before the breakeven point is reached? Such a fall could be due to competitor's better product, poorly executed marketing programs and so on.

Assume you have fixed cost of \$ 2,000, selling price of \$ 200 and variable cost per unit of \$ 120. For 40 units sold, the budgeted point from this set of assumptions is 25 units ($\$ 2,000 \div \$ 80$) or \$ 5,000 ($\$ 200 \times 25$). Hence, the margin of safety is \$ 3,000 ($\$ 8,000 - 5,000$) or 15 ($40 - 25$) units.

Sensitivity analysis is an approach to recognizing uncertainty, i.e. the possibility that an actual amount will deviate from an expected amount.

Marginal Cost Equations and Breakeven Analysis

From the marginal cost statements, one might have observed the following:

$$\text{Sales} - \text{Marginal cost} = \text{Contribution} \dots\dots(1)$$

$$\text{Fixed cost} + \text{Profit} = \text{Contribution} \dots\dots(2)$$

By combining these two equations, we get the fundamental marginal cost equation as follows:

$$\text{Sales} - \text{Marginal cost} = \text{Fixed cost} + \text{Profit} \dots\dots(3)$$

This fundamental marginal cost equation plays a vital role in profit projection and has a wider application in managerial decision-making problems.

The sales and marginal costs vary directly with the number of units sold or produced. So, the difference between sales and marginal cost, i.e. contribution, will bear a relation to sales and the ratio of contribution to sales remains constant at all levels. This is profit volume or P/V ratio. Thus,

$$\text{P/V Ratio (or C/S Ratio)} = \frac{\text{Contribution (c)}}{\text{Sales (s)}} \dots\dots(4)$$

It is expressed in terms of percentage, i.e. P/V ratio is equal to $(C/S) \times 100$.

$$\text{Or, Contribution} = \text{Sales} \times \text{P/V ratio} \dots\dots(5)$$

$$\text{Or, Sales} = \frac{\text{Contribution}}{\text{P/V ratio}} \dots\dots(6)$$

The above-mentioned marginal cost equations can be applied to the following heads:

1. Contribution

Contribution is the difference between sales and marginal or variable costs. It contributes toward fixed cost and profit. The concept of contribution helps in deciding breakeven point, profitability of products, departments etc. to perform the following activities:

- Selecting product mix or sales mix for profit maximization
- Fixing selling prices under different circumstances such as trade depression, export sales, price discrimination etc.

2. Profit Volume Ratio (P/V Ratio), its Improvement and Application

The ratio of contribution to sales is P/V ratio or C/S ratio. It is the contribution per rupee of sales and since the fixed cost remains constant in short term period, P/V ratio will also measure the rate of change of profit due to change in volume of sales. The P/V ratio may be expressed as follows:

$$\text{P/V ratio} = \frac{\text{Sales} - \text{Marginal cost of sales}}{\text{Sales}} = \frac{\text{Contribution}}{\text{Sales}} = \frac{\text{Changes in contribution}}{\text{Changes in sales}} = \frac{\text{Change in profit}}{\text{Change in sales}}$$

A fundamental property of marginal costing system is that P/V ratio remains constant at different levels of activity.

A change in fixed cost does not affect P/V ratio. The concept of P/V ratio helps in determining the following:

- Breakeven point
- Profit at any volume of sales
- Sales volume required to earn a desired quantum of profit
- Profitability of products
- Processes or departments

The contribution can be increased by increasing the sales price or by reduction of variable costs. Thus, P/V ratio can be improved by the following:

- Increasing selling price
- Reducing marginal costs by effectively utilizing men, machines, materials and other services
- Selling more profitable products, thereby increasing the overall P/V ratio

3. Breakeven Point

Breakeven point is the volume of sales or production where there is neither profit nor loss. Thus, we can say that:

Contribution = Fixed cost

Now, breakeven point can be easily calculated with the help of fundamental marginal cost equation, P/V ratio or contribution per unit.

NOTES

a. Using Marginal Costing Equation

S (sales) – V (variable cost) = F (fixed cost) + P (profit) At BEP P = 0, BEP S – V = F

By multiplying both the sides by S and rearranging them, one gets the following equation:

$$S \text{ BEP} = F.S/S-V$$

b. Using P/V Ratio

$$\text{Sales } S \text{ BEP} = \frac{\text{Contribution at BEP}}{P/V \text{ ratio}} = \frac{\text{Fixed cost}}{P/V \text{ ratio}}$$

Thus, if sales is \$ 2,000, marginal cost \$ 1,200 and fixed cost \$ 400, then:

$$\text{Breakeven point} = \frac{400 \times 2000}{2000 - 1200} = \$ 1000$$

Similarly, $\frac{P/V \text{ ratio}}{800} = 2000 - 1200 = 0.4 \text{ or } 40\%$

So, breakeven sales = \$ 400 / .4 = \$ 1000

c. Using Contribution per unit

$$\text{Breakeven point} = \frac{\text{Fixed cost}}{\text{Contribution per unit}} = 100 \text{ units or } \$ 1000$$

4. Margin of Safety (MOS)

Every enterprise tries to know how much above they are from the breakeven point. This is technically called margin of safety. It is calculated as the difference between sales or production units at the selected activity and the breakeven sales or production.

Margin of safety is the difference between the total sales (actual or projected) and the breakeven sales. It may be expressed in monetary terms (value) or as a number of units (volume). It can be expressed as profit / P/V ratio. A large margin of safety indicates the soundness and financial strength of business.

Margin of safety can be improved by lowering fixed and variable costs, increasing volume of sales or selling price and changing product mix, so as to improve contribution and overall P/V ratio.

$$\text{Margin of safety} = \text{Sales at selected activity} - \text{Sales at BEP} = \frac{\text{Profit at selected activity}}{\text{P/V ratio}}$$

Margin of safety is also presented in ratio or percentage as follows:

$$\frac{\text{Margin of safety (sales)} \times 100 \%}{\text{Sales at selected activity}}$$

NOTES

The size of margin of safety is an extremely valuable guide to the strength of a business. If it is large, there can be substantial falling of sales and yet a profit can be made. On the other hand, if margin is small, any loss of sales may be a serious matter. If margin of safety is unsatisfactory, possible steps to rectify the causes of mismanagement of commercial activities as listed below can be undertaken.

- a. Increasing the selling price— It may be possible for a company to have higher margin of safety in order to strengthen the financial health of the business. It should be able to influence price, provided the demand is elastic. Otherwise, the same quantity will not be sold.
- b. Reducing fixed costs
- c. Reducing variable costs
- d. Substitution of existing product(s) by more profitable lines e. Increase in the volume of output
- e. Modernization of production facilities and the introduction of the most cost effective technology

Problem 1

A company earned a profit of \$ 30,000 during the year 2000-01. Marginal cost and selling price of a product are \$ 8 and \$ 10 per unit respectively. Find out the margin of safety.

Solution

$$\text{Margin of safety} = \frac{\text{Profit}}{\text{P/V ratio}}$$

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

Problem 2

A company producing a single article sells it at \$ 10 each. The marginal cost of production is \$ 6 each and fixed cost is \$ 400 per annum. You are required to calculate the following:

- Profits for annual sales of 1 unit, 50 units, 100 units and 400 units

NOTES

- P/V ratio
- Breakeven sales
- Sales to earn a profit of \$. 500
- Profit at sales of \$. 3,000
- New breakeven point if sales price is reduced by 10%
- Margin of safety at sales of 400 units

Solution Marginal Cost Statement

Particulars	Amount	Amount	Amount	Amount
Units produced	1	50	100	400
Sales (units * 10)	10	500	1000	4000
Variable cost	6	300	600	2400
Contribution (sales- VC)	4	200	400	1600
Fixed cost	400	400	400	400
Profit (Contribution – FC)	-396	-200	0	1200

Profit Volume Ratio (PVR) = Contribution/Sales * 100 = 0.4 or 40%

Breakeven sales (\$) = Fixed cost / PVR = 400/ 40 * 100 = \$. 1,000

Sales at BEP = Contribution at BEP/ PVR = 100 units

Sales at profit \$. 500

Contribution at profit \$. 500 = Fixed cost + Profit = \$. 900

Sales = Contribution/PVR = 900/.4 = \$. 2,250 (or 225 units)

Profit at sales \$. 3,000

Contribution at sale \$. 3,000 = Sales x P/V ratio = 3000 x 0.4 = \$. 1,200

Profit = Contribution – Fixed cost = \$. 1200 – \$. 400 = \$. 800

New P/V ratio = \$. 9 – \$. 6/\$. 9 = 1/3

$$\text{Sales at BEP} = \frac{\text{Fixed cost}}{\text{PV ratio}} = \frac{\$. 400}{1/3} = \$. 1,200$$

Margin of safety (at 400 units) = 4000-1000/4000*100 = 75 %

(Actual sales – BEP sales/Actual sales * 100)

Breakeven Analysis— Graphical Presentation

Apart from marginal cost equations, it is found that breakeven chart and profit graphs are useful graphic presentations of this cost-volume-profit relationship.

Breakeven chart is a device which shows the relationship between sales volume, marginal costs and fixed costs, and profit or loss at different levels of activity.

Such a chart also shows the effect of change of one factor on other factors and exhibits the rate of profit and margin of safety at different levels.

A breakeven chart contains, inter alia, total sales line, total cost line and the point of intersection called breakeven point. It is popularly called breakeven chart because it shows clearly breakeven point (a point where there is no profit or no loss).

Profit graph is a development of simple breakeven chart and shows clearly profit at different volumes of sales.

Construction of a Breakeven Chart

The construction of a breakeven chart involves the drawing of fixed cost line, total cost line and sales line as follows:

1. Select a scale for production on horizontal axis and a scale for costs and sales on vertical axis.
2. Plot fixed cost on vertical axis and draw fixed cost line passing through this point parallel to horizontal axis.
3. Plot variable costs for some activity levels starting from the fixed cost line and join these points. This will give total cost line.

Alternatively, obtain total cost at different levels, plot the points starting from horizontal axis and draw total cost line.

4. Plot the maximum or any other sales volume and draw sales line by joining zero and the point so obtained.

Uses of Breakeven Chart

A breakeven chart can be used to show the effect of changes in any of the following profit factors:

- Volume of sales
- Variable expenses
- Fixed expenses
- Selling price

NOTES

Problem

A company produces a single article and sells it at \$. 10 each. The marginal cost of production is \$. 6 each and total fixed cost of the concern is \$. 400 per annum.

NOTES

Construct a breakeven chart and show the following:

- Breakeven point
- Margin of safety at sale of \$. 1,500
- Angle of incidence
- Increase in selling price if breakeven point is reduced to 80 units

Solution

A breakeven chart can be prepared by obtaining the information at these levels:

Output units	40	80	120	200
Sales	\$.	\$.	\$.	\$.
	400	800	1,200	2,000
Fixed cost	400	400	400	400
Variable cost	240	480	400	720
Total cost	640	880	1,120	1,600

Fixed cost line, total cost line and sales line are drawn one after another following the usual procedure described herein:

This chart clearly shows the breakeven point, margin of safety and angle of incidence.

- a. Breakeven point— Breakeven point is the point at which sales line and total cost line intersect. Here, B is breakeven point equivalent to sale of \$. 1,000 or 100 units.
- b. Margin of safety— Margin of safety is the difference between sales or units of production and breakeven point. Thus, margin of safety at M is sales of (\$. 1,500 - \$. 1,000), i.e. \$. 500 or 50 units.
- c. Angle of incidence— Angle of incidence is the angle formed by sales line and total cost line at breakeven point. A large angle of incidence shows a high rate of profit being made. It should be noted that the angle of incidence is universally denoted by data. Larger the angle, higher the profitability indicated by the angel of incidence.
- d. At 80 units, total cost (from the table) = \$. 880. Hence, selling price for breakeven at 80 units = $\$. 880 / 80 = \$. 11$ per unit. Increase in selling price is Re. 1 or 10% over the original selling price of \$. 10 per unit.

Limitations and Uses of Breakeven Charts

A simple breakeven chart gives correct result as long as variable cost per unit, total fixed cost and sales price remain constant.

In practice, all these factors may change and the original breakeven chart may give misleading results.

But then, if a company sells different products having different percentages of profit to turnover, the original combined breakeven chart fails to give a clear picture when the sales mix changes. In this case, it may be necessary to draw up a breakeven chart for each product or a group of products. A breakeven chart does not take into account capital employed which is a very important factor to measure the overall efficiency of business.

Fixed costs may increase at some level whereas variable costs may sometimes start to decline. For example, with the help of quantity discount on materials purchased, the sales price may be reduced to sell the additional units produced etc. These changes may result in more than one breakeven point, or may indicate higher profit at lower volumes or lower profit at still higher levels of sales.

Nevertheless, a breakeven chart is used by management as an efficient tool in marginal costing, i.e. in forecasting, decision-making, long term profit planning and maintaining profitability. The margin of safety shows the soundness of business whereas the fixed cost line shows the degree of mechanization. The angle of incidence is an indicator of plant efficiency and profitability of the product or division under consideration. It also helps a monopolist to make price discrimination for maximization of profit.

Multiple Product Situations

In real life, most of the firms turn out many products. Here also, there is no problem with regard to the calculation of BE point. However, the assumption has to be made that the sales mix remains constant. This is defined as the relative proportion of each product's sale to total sales. It could be expressed as a ratio such as 2:4:6, or as a percentage as 20%, 40%, 60%.

The calculation of breakeven point in a multi-product firm follows the same pattern as in a single product firm. While the numerator will be the same fixed costs, the denominator now will be weighted average contribution margin. The modified formula is as follows:

$$\text{Breakeven point (in units)} = \frac{\text{Fixed costs}}{\text{Weighted average contribution margin per unit}}$$

One should always remember that weights are assigned in proportion to the relative sales of all products. Here, it will be the contribution margin of each product multiplied by its quantity.

NOTES

Breakeven Point in Sales Revenue

Here also, numerator is the same fixed costs. The denominator now will be weighted average contribution margin ratio which is also called weighted average P/V ratio. The modified formula is as follows:

NOTES

$$\text{B.E. point (in revenue)} = \frac{\text{Fixed cost}}{\text{Weighted average P/V ratio}}$$

Problem Ahmedabad Company Ltd. manufactures and sells four types of products under the brand name Ambience, Luxury, Comfort and Lavish. The sales mix in value comprises the following:

Brand name	Percentage
Ambience	33 1/3
Luxury	41 2/3
Comfort	16 2/3
Lavish	8 1/3
	100

The total budgeted sales (100%) are \$ 6,00,000 per month.

The operating costs are:

Ambience 60% of selling price Luxury

Luxury 68% of selling price Comfort

Comfort 80% of selling price Lavish

Lavish 40% of selling price

The fixed costs are \$ 1,59,000 per month.

- a. Calculate the breakeven point for the products on an overall basis.
- b. It has been proposed to change the sales mix as follows, with the sales per month remaining at \$ 6,00,000:

Brand name	Percentage
Ambience	25
Luxury	40
Comfort	30
Lavish	05
	100

Assuming that this proposal is implemented, calculate the new breakeven point.

Solution

- a. Computation of the Breakeven Point on Overall Basis
- b. Computation of the New Breakeven Point

Profit Graph

Profit graph is an improvement of a simple breakeven chart. It clearly exhibits the relationship of profit to volume of sales. The construction of a profit graph is relatively easy and the procedure involves the following:

1. Selecting a scale for the sales on horizontal axis and another scale for profit and fixed costs or loss on vertical axis. The area above horizontal axis is called profit area and the one below it is called loss area.
2. Plotting the profits of corresponding sales and joining them. This is profit line.

NOTES

COST VOLUME PROFIT ANALYSIS

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

CVP analysis has following assumptions:

1. All cost can be categorized as variable or fixed.
2. Sales price per unit, variable cost per unit and total fixed cost are constant.
3. All units produced are sold.

Where the problem involves mixed costs, they must be split into their fixed and variable component by High-Low Method, Scatter Plot Method or Regression Method.

CVP Analysis Formula

The basic formula used in CVP Analysis is derived from profit equation:

$$px = vx + FC + \text{Profit}$$

In the above formula,

p is price per unit;

v is variable cost per unit;

x are total number of units produced and sold; and

FC is total fixed cost

Check your progress

3. What is a profit graph?
4. What is a break even point?

NOTES

Besides the above formula, CVP analysis also makes use of following concepts:

Contribution Margin (CM)

Contribution Margin (CM) is equal to the difference between total sales (S) and total variable cost or, in other words, it is the amount by which sales exceed total variable costs (VC). In order to make profit the contribution margin of a business must exceed its total fixed costs. In short:

$$CM = S - VC$$

Unit Contribution Margin (Unit CM)

Contribution Margin can also be calculated per unit which is called Unit Contribution Margin. It is the excess of sales price per unit (p) over variable cost per unit (v). Thus:

$$\text{Unit CM} = p - v$$

Contribution Margin Ratio (CM Ratio)

Contribution Margin Ratio is calculated by dividing contribution margin by total sales or unit CM by price per unit.

Cost-volume-profit (CVP) analysis is used to determine how changes in costs and volume affect a company's operating income and net income. In performing this analysis, there are several assumptions made, including:

- Sales price per unit is constant.
- Variable costs per unit are constant.
- Total fixed costs are constant.
- Everything produced is sold.
- Costs are only affected because activity changes.
- If a company sells more than one product, they are sold in the same mix.

CVP analysis requires that all the company's costs, including manufacturing, selling, and administrative costs, be identified as variable or fixed.

COST AUDIT

Cost Audit represents the verification of cost accounts and check on the adherence to cost accounting plan. Cost Audit ascertain the accuracy of cost accounting records to ensure that they are in conformity with Cost Accounting principles, plans, procedures and objective.¹ Cost Audit comprises following;

1. Verification of the cost accounting records such as the accuracy of the cost accounts, cost reports, cost statements, cost data and costing technique and

2. Examination of these records to ensure that they adhere to the cost accounting principles, plans, procedures and objective.

OBJECTIVES

1. Prospective Objective: Under which cost audit aims to identify the undue wastage or losses and ensure that costing system determines the correct and realistic cost of production.
1. Constructive Objectives: Cost audit provides useful information to the management regarding regulating production, economical method of operation, reducing cost of operation and reformulating Cost accounting plans .

Concept, Functions And Objectives Of Management Audit

Concept Of Management Audit

Management audit is an emerging concept of auditing. It has been originated from America. Management audit is an act of evaluation of all the activities of all the departments with a view to provide appropriate suggestions to the management to help their work. In other words, management auditing is a future oriented task which evaluates timely in all the levels of management like production management, sales management etc.

The main objective of management audit is to improve the profit earning capacity, work of management, objectives of program, social objectives and human resource development so that organizational goal can be easily attained. It refers to the existence of control system, compliance of rules and regulations, process of managerial decisions etc.

Functions Of Management Audit

Management audit is a difficult and complex task. It performs the following functions:

1. Management audit identifies the objectives of an organization if such objectives are not set up.
2. Management audit allocates the overall objectives of an organization in small parts.
3. Management audit reviews the structure of organization and asset of the organization and decides whether goals can be obtained or not.
4. Management audit examines all the scope of work and liability centers.
5. Management audit provides valuable suggestions to the management after the evaluation of all above facts.

NOTES

Objectives Of Management Audit

Main objectives of management audit are as follows:

1. To formulate the goal of an organization.
2. To ensure the fulfillment of goals.
3. To help management to improve the activities and procedures.
4. To help all the members of management to make effective discharge of their duties.
5. To help in the improvement of profits.

NOTES

CASE

Contribution margin and contribution margin ratio

Key calculations when using CVP analysis are the **contribution margin** and the **contribution margin ratio**.

The contribution margin represents the amount of income or profit the company made before deducting its fixed costs. Said another way, it is the amount of sales dollars available to cover (or contribute to) fixed costs. When calculated as a ratio, it is the percent of sales dollars available to cover fixed costs. Once fixed costs are covered, the next dollar of sales results in the company having income.

The contribution margin is sales revenue minus all variable costs. It may be calculated using dollars or on a per unit basis. If The Three M's, Inc., has sales of \$750,000 and total variable costs of \$450,000, its contribution margin is \$300,000. Assuming the company sold 250,000 units during the year, the per unit sales price is \$3 and the total variable cost per unit is \$1.80. The contribution margin per unit is \$1.20. The contribution margin ratio is 40%. It can be calculated using either the contribution margin in dollars or the contribution margin per unit. To calculate the contribution margin ratio, the contribution margin is divided by the sales or revenues amount.

Contribution Margin

	<u>\$</u>	<u>Per unit</u>
Sales	\$750,000	\$3.00
Variable Costs	<u>450,000</u>	<u>1.80</u>
Contribution Margin	<u>300,000</u>	<u>\$1.20</u>

Contribution Margin Ratio

$$\frac{\text{Contribution Margin}}{\text{Sales}} = \frac{\$300,000}{\$750,000} = 40\% \qquad \frac{\$1.20}{\$3.00} = 40\%$$

Summary

1. Fixed and variable cost classification helps in CVP analysis. Marginal cost is also useful for such analysis.
2. Breakeven point is the incidental study of CVP. It is the point of no profit and no loss. At this specific level of operation, it covers total costs, including variable and fixed overheads.
3. Breakeven chart is the graphical representation of cost structure of business.
4. Profit/Volume (P/V) ratio shows the relationship between contribution and value/volume of sales. It is usually expressed as terms of percentage and is a valuable tool for the profitability of business.
5. Margin of safety is the difference between sales or units of production and breakeven point. The size of margin of safety is an extremely valuable guide to the financial strength of a business.

NOTES

Answers to check your progress

1. Variable cost
2. Cost volume profit analysis
3. Profit graph is an improvement of a simple breakeven chart. It clearly exhibits the relationship of profit to volume of sales.
4. Breakeven point is the point at which sales line and total cost line intersect

Evaluate Yourself

1. Discuss the concept of fixed and variable cost.
2. CVP analysis is a useful technique for managerial decision-making. Discuss.
3. CVP analysis has no limitation. Discuss.
4. What is a breakeven chart?
5. What questions can a breakeven chart answer to?
6. Provide a formula to determine the breakeven point of a single product, multi-product and different divisions and subdivisions of an organization.
7. What are the disadvantages of using breakeven analysis?
8. Define contribution margin.
9. Explain— Margin of safety shows the financial strength of a business.

Further Readings

1. *Production Management* by Lawrence L.; Walter L. Tann;
2. *Production planning and control* – Taylor and Francis

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