

STRATEGIC COST MANAGEMENT
(Theory)
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1: STRATEGIC COST MANAGEMENT AND CONTROL

TARGET COSTING

Meaning: Target Costing is defined as “a structured approach to determine the cost at which a proposed product with specified functionality and quality must be produced, to generate a desired level of profitability at its anticipated-selling-price”

Steps in Target Costing approach to pricing:

1. **Setting of target selling price:** The setting of target selling price of a product which customers are prepared to pay, depend on many factors like design specifications of the product, competitive conditions, customer’s demand for increased functionality and higher quality projected production volume, sales forecasts etc. A concern can set its target selling price after taking into account all of the aforesaid factors.
2. **Determination of target costs:** Target profit margin may be established after taking into account long-term profit objectives and projected volume of sales. On deducting target profit margin from target selling price, target cost is determined.
3. **Estimate the actual cost of the product:** Actual cost of the product may be determined after taking into account the design specifications, material cost and other costs required to produce the product.
4. **Comparison of estimated cost with actual cost:** In case the estimated cost of the product is higher than that of the target cost of the product then the concern should resort to cost reduction methods involving the use of **Value Engineering / Value Analysis** tools. (refer complete Value Engineering Process in Activity Based Costing)

Steps involved in implementing a Target Costing System

1. **Create a Project Charter:** Project Charter is a document, approved by top management that describes its goals and what it is authorized to do. This Charter is based on the corporate mission statement and related goals. Written approval of Project Charter by the top management provides the target costing effort with a strong basis of support and direction in all subsequent efforts.
2. **Obtain a Management Sponsor:** Management Sponsor is an individual belonging to top management. His role will be to support the initiative in all respects, to obtain funding, to coordinate with other members of top management, to eliminate problems in a timely manner.
3. **Obtain a Budget:** The funding should be based on a formal allocation of money through the corporate budget. The fund should be given unreservedly to the target costing effort.

4. **Assign a Strong Team Manager:** The Target Costing Team involves the active participation of many members with diverse backgrounds. A strong Team Manager is required to bring the group together as a smooth functioning team focused on key objectives. He should be skilled in dealing with management, the use of project tools and working with a diverse group of people. This manager should be a full-time employee, so that his or her complete attention can be directed towards the welfare of the project.
5. **Enroll Full-time Participants:** It is essential that the members of the team be devoted to it full-time rather than trying to fulfill other commitment elsewhere in the company at the same time. They should have a single focus on ensuring the success of the target- costing program.
6. **Use Project Management Tools:** Target costing can be a highly complex effort especially for high-cost products with many features and components. The team should use all available project management tools, such as Microsoft Project (for tracking the completion of specific tasks), a company database containing various types of costing information and a variety of product design tools.

Advantages of Target Costing:

1. **Innovation:** It reinforces top-to-bottom commitment to process and product innovation and is aimed at identifying issues to be resolved.
2. **Competitive Advantage:** It enables a firm to achieve competitive advantage over other firms in the industry. The firm, which achieves cost reduction targets realistically, stands to gain in the long run.
3. **Market Driven Management:** It helps to create a company's competitive future with market-driven management for designing and manufacturing products that meet the price required for market success.
4. **Real Cost Reduction:** It uses management control systems to support and reinforce manufacturing strategies and to identify market opportunities that can be converted into real savings to achieve the best value rather than simply the lowest cost.

Problems with Target Costing

1. The development process can be lengthened to a considerable extent since the design team may require a number of design iterations before it can devise a sufficiently low-cost product that meets the target cost and margin criteria.
2. A large amount of mandatory cost cutting can result in finger-pointing in various parts of the company, especially if employees in one area feel they are being called on to provide a disproportionately large part of the savings.
3. Representatives from number of departments on the design team can sometimes make it more difficult to reach a consensus on the proper design.

Life Cycle Costing

Life cycle costing, aims at cost ascertainment of a product, project etc. over its projected life. It is a system that tracks and accumulates the actual costs and revenues attributable to cost object from its inception to its abandonment.

Product Life Cycle

Product life cycle is a pattern of expenditure, sale level, revenue and profit over the period from new idea generation to the deletion of product from product range.

Product life cycle spans the time from initial R&D on a product to when customer servicing and support is no longer offered for the product. For products like motor vehicles this time span may range from 5 to 7 years. For some basic pharmaceuticals, the time span may be 7 to 10 years. In case of cameras, photocopying machines etc. the life is more than 100 years.

Phases in product life cycle

The four identifiable phases in the Product Life Cycle are (a) Introduction (b) Growth (c) Maturity and (d) Decline. A comparative analysis of these phases is given below.

| Particulars | Introduction | Growth | Maturity | Decline |
|--------------------------------------|--|--|---|--|
| Phase | I | II | III | IV |
| Sales Volume | Initial stages, hence low | Rise in sales levels at increasing rates. | Rise in sales levels at decreasing rates. | Sales level off and then start decreasing. |
| Prices of Products | High levels to cover initial costs and promotional expenses. | Retention of high level prices except in certain cases* | Prices fall closer to cost, due to effect of competition | Gap between price and cost is further reduced. |
| Ratio of promotion expenses to Sales | Highest, due to effort needed to inform potential customers, launch products, distribute to customers etc. | Total expenses remain the same, while ratio is reduced due to increase in sales. | Ratio reaches a normal % of sales. Such normal % becomes the industry standard. | Reduced sales promotional efforts as the product is no longer in demand. |
| Competition | Negligible and insignificant | Entry of a large number of competitors | Fierce Competition | Starts disappearing due to withdrawal of products |
| Profits | NIL due to heavy initial costs. | Increase at a rapid pace. | Normal rate of profits since costs and prices are normalized. | Declining profits due to price competition, entry of new products etc. |

* In the growth stage, the firm will maintain the prices at the high levels, in order to realise maximum profits. Price reduction will not be undertaken unless the low prices will lead rise in demand resulting in high profits.

Product Life Cycle Costing

It is an approach used to provide a long term picture of product line profitability, feedback on the effectiveness of life cycle planning cost data to clarify the economic impact of alternatives chose in the design, engineering phase etc. It is also considered as a way to enhance the control of manufacturing costs. The thrust of product life cycle costing is on the distribution of costs among categories changes over the life of the product, as does the potential profitability of a product. Hence it is important to track and measure costs during each stage of a product's life cycle.

Features / Characteristics Of Product Life Cycle Costing:

Product life cycle costing is important due to the following features:

- Product life cycle costing involves tracing of costs and revenues of each product over several calendar periods throughout their entire life cycle. Costs and revenues can be analysed by time periods, but the emphasis is on costs and revenue accumulation over the entire life cycle for each product.
- Product life cycle costing traces research and design and development costs, incurred to individual products over their entire life cycles, so that the total magnitude of these costs for each individual product can be reported and compared with product revenues generated in later periods.
- Life cycle costing therefore ensures that costs for each individual product can be reported and compared with product revenues generated in later periods. Hence, the costs are made more visible.

Benefits Of Product Life Cycle Costing:

The benefits of product life cycle costing are summarized as follows:

- The product life cycle costing results in earlier actions to generate revenue or to lower costs than otherwise might be considered. There are a number of factors that need to be managed in order to maximize return on a product.
- Better decisions should follow from a more accurate and realistic assessment of revenues and costs, at least within a particular life cycle stage.
- Product life cycle thinking can promote long-term rewarding in contrast to short-term profitability rewarding.

Importance of Product Life Cycle Costing:

Product Life Cycle Costing is considered important due to the following reasons:

1. **Time based analysis:** Life cycle costing involves tracing of costs and revenues of each product over several calendar periods throughout their life cycle. Costs and revenues can be analysed by time

periods. The total magnitude of costs for each individual product can be reported and compared with product revenues generated in later periods.

2. **Overall Cost Analysis:** Production costs are accounted and recognized by the routine accounting system. However non-production costs like R&D, design, marketing, distribution, customer service etc. are less visible on a product-by-product basis. Product Life Cycle Costing focuses on recognizing both production and non-production cost.
3. **Pre-production Costs analysis:** The development period for R&D and design is long and costly. A high percentage of total product costs may be incurred before commercial production begins. Hence, the company needs accurate information on such costs for deciding whether to continue with the R&D or not.
4. **Effective Pricing Decisions:** Pricing Decisions, in order to be effective, should include market consideration on the one hand and cost considerations on the other. Product Life Cycle Costing and Target Costing help analyse both these considerations and arrive at optimal price decisions.
5. **Better Decision Making:** Better decisions should follow from a more accurate and realistic assessment of revenues and costs, at least within a particular life cycle stage.
6. **Long Run Wholistic view:** Product life cycle thinking can promote long-term rewarding in contrast to short-term profitability rewarding. It provides an overall framework for considering total incremental costs over the entire life span of a product, which in turn facilitates analysis of parts of the whole where cost effectiveness might be improved.
7. **Life Cycle Budgeting:** Life Cycle Budgeting, i.e. Life Cycle Costing with Target Costing principles, facilitates scope for cost reduction at the design stage itself. The Company stands to benefit since costs are avoided before they are committed or locked in.
8. **Review:** Life Cycle Costing provides scope for analysis of long term picture of product line profitability, feedback on the effectiveness of life cycle planning and cost data to clarify the economic impact of alternatives chosen in the design, engineering phase etc.

KAIZEN COSTING

Kaizen Costing refers to the ongoing continuous improvement program that focuses on the reduction of waste in the production process, thereby further lowering costs below the initial targets specified during the design phase. It is a Japanese term for a number of cost reduction steps that can be used subsequent to issuing a new product design to the factory floor. The initial VE review may not be complete and perfect in all costs aspects. There may be further chances of waste reduction, cost and time reduction and product improvement. Such continuous cost reduction technique is call as Kaizen Costing.

The review of product costs under the target costing methodology is not reserved just for the period up to the completion of design work on a new product. On the contrary, there are always opportunities to control costs after the design phase is completed, though these opportunities are fewer than during the design phase.

Kaizen Costing Process: Activities in kaizen costing include elimination of waste in production, assembly and distribution processes, as well as the elimination of work steps in any of these areas. Thus kaizen costing is really designed to repeat many of the value engineering steps for as long as a product is produced, constantly refining the process and thereby stripping out extra costs at each stage.

Savings from Kaizen Costing: The cost reductions resulting from kaizen costing are much smaller than those achieved with value engineering. But these are still significant since competitive pressures are likely to force down the price of a product over time, and any possible cost savings allow a company to still attain its targeted profit margins while continuing to reduce cost.

Multiple Versions of Products - Continuous Kaizen Costing: Multiple improved versions of products can be introduced to meet the challenge of gradually reducing costs and prices. The market price of products continues to drop over time, which forces a company to use both target and kaizen costing to reduce costs and retain its profit margin.

However, prices eventually drop to the point where margins are reduced, which forces the company to develop a new product with lower initial cost and for which kaizen costing can again be used to further reduce costs. This pattern may be repeated many times as a company forces its costs down through successive generations of products.

The exact timing to switch to a new product is easy to determine well in advance since the returns from kaizen costing follow a trend line of gradually shrinking savings. Since prices also follow a predictable downward track, plotting these two trend lines into the future reveals when a new product version must be ready for production.

Just In Time

A JIT approach is a collection of ideas and philosophy that streamline a company's production process activities to such an extent that waste of all kind viz. material and labour is systematically driven out of the process. Just in Time technique enables a company to ensure that it receives products / spare parts / materials from its suppliers on the exact date and at the exact time when they are needed. The steps involved are:

- a. **Supplier Evaluation:** The Purchasing Department must evaluate and investigate every supplier and eliminate those who could not keep up with the delivery dates.
- b. **Supplier Assistance:** The engineering staff must visit supplier sites and examine their processes, not only to see if they can reliably ship high-quality parts but also to provide them with engineering assistance to bring them up to a higher standard of product.
- c. **Supplier Information System:** The firm must install a system, which is as simple as a fax machine or as advanced as an electronic data interchange system or linked computer systems, that communicates with suppliers as to exactly how much of specified parts are to be sent to the company.
- d. **Direct Delivery:** Deliveries should be sent straight to the production floor for immediate use in manufactured products, so that no time spent in inspecting the parts for defects. Drivers, who bring supplies of materials, drop them off at the specific machines that will use the materials first.

Benefits associated with JIT system

Reduction in Inventory levels: Unnecessary piling up of Raw Materials, WIP and finished goods are avoided. The focus is on production and purchase as per the firm's requirements. Under a JIT system, the amount of inventory retained in a company drops continuously as under:

- Raw materials inventory is reduced because suppliers deliver only small quantities of parts as and when they are needed.
- Work-in-progress inventory drops because the conversion to machine cells and the use of kanban cards greatly reduces the need to pile up inventory between machines.
- Finished goods inventory drops because inventories are allowed to build up only if a company experiences high seasonal sales.

Reduction in Wastage of Time: The key focus of any JIT system is on reducing various kinds of wastage of time, so that the entire production process is concentrated on the time spent in actually producing products. By reducing wastage of time, the firm effectively eliminates activities that do not contribute to the value of a product which in turn reduces the costs associated with them. Time reduction can be achieved in the following manner.

- **Inspection Time:** All inspection time is eliminated from the system as operators conduct their own quality checks. Suppliers' assistance and quality checks at supplier's factory eliminate the need for separate inspection or QC department in the firm.
- **Handling Time:** All movement, which involves shifting inventory and work in process throughout the various parts of the plant, can be eliminated by clustering machines together in logical groupings called Working Cells
- **Queue Time:** Queue time is eliminated by not allowing inventory to build up in front of machines. Kanban cards serve this purpose.
- **Storage Time:** Clearing out excessive stocks of inventory and having suppliers deliver parts only as and when needed eliminates Storage time.

Reduction in Scrap Rates: There will be sharp reductions in the rates of defectives or scrapped units. The workers themselves identify defects and take prompt action to avoid their recurrence.

Reduction in Overhead Costs: Overhead Costs are greatly reduced with JIT operation. This is because of the following reasons:

- Elimination of non value-added activities and improvement in value-added activities. Reduction of time
- Reduction in Inventory levels and associated costs
- Reduction / Elimination of unnecessary cost drivers
- Introduction of "Machine Cells" to identify direct costs than overhead expenses.

The effect of JIT philosophy on Overhead is three-fold:

- Thorough reduction in Overhead Costs
- Shift between Overhead Costs and Direct Costs, due to introduction of Machine Cells
- Scientific Allocation of common overheads based on Machine Cells and Cost Drivers

By reducing unnecessary (non value-added) activities and the associated time and cost-drivers, overheads can be greatly reduced e.g. material handling costs, rework costs, facility costs etc.

JIT approach for reducing WIP inventory

At times, there may be huge differences between the operating speeds of different machines. This affects cost in following manner:

1. Work-in-process inventory builds up in front of the slowest machines.
2. Defective parts produced by an upstream machine may not be discovered until the next downstream machine operator finds them later. By that time, the upstream machine may have created more defective parts, all of which must now be destroyed or reworked.

In JIT philosophy, there are two ways to resolve the above problems.

1. **Kanban Card:** It is a notification card that a downstream machine sends to each upstream machine that feeds it with parts, authorizing the production of just enough components to fulfill the production requirements. This is also known as “pull” system, since these cards are initiated at the end of the production process pulling work authorizations through the production system. WIP cannot pile up since it can be created only with kanban authorization.
2. **Working Cells:** A Working cell is a small cluster of machines, which can be run by a single machine operator. The establishment of working cells has the following advantages:
 - The individual machine operator takes each output part from machine to machine within the cell; and thus there is no way for WIP to build up between machines.
 - The operator can immediately identify defective output which otherwise is difficult for each machine of the cell. The smaller machines used in a machine cell are generally much simpler than the large automated machinery they replace. Hence maintenance costs are reduced.
 - It is much easier to reconfigure the production facility when it is necessary to produce different products, avoiding the large expense of carefully repositioning and aligning equipment.

What are the performance measures in JIT

The following performance measurement criteria are relevant to JIT.

1. **Inventory turnover:** One of the primary objectives of JIT systems is the reduction of unnecessary inventory. Hence inventory turnover is a suitable performance measure in JIT. This measure can be subdivided into separate ratios for raw materials, work in process, and finished goods.
2. **Set up time reduction:** The average setup time per machine can be measured periodically and plotted on a trend line. The shortest possible set intervals are crucial for the success of short production runs, so this is a major JIT measurement. It is best to measure it by machine, rather than in the aggregate for all machines.
3. **Customer complaints:** JIT presumes optimum product quality. Hence customer complaints on product problems should be investigated immediately. The accumulation of customer complaints and their dissemination to management should be considered a major JIT measure.

4. **Scrap:** JIT aims to drive materials scrap rates down to exceedingly low level. The cost of scrap (especially when supported by a detailed list of items that were scrapped) is of particular concern as a JIT system is being implemented, since it helps to identify problem areas requiring further management attention.
5. **Cost of quality:** One focus of JIT is on creating high-quality products, so it is reasonable to keep track of the full cost of quality (which comprises defect control costs, failure costs, and the cost of lost sales) on a trend line. Managers want to see the details behind this measure so that they know where the largest quality costs still reside in the company and can then work to reduce them.
6. **Customer service:** This measure really has several components like delivering products on the dates required by customers shipping full orders to customers, and not having products returned because of poor quality. This measure can be summarized in a variety of ways or reported at the component level, but the main issue is to measure and post the information for all to see, so that the company focuses strongly on providing the highest possible degree of customer service.
7. **Ideas generated:** JIT system works best when employees provide suggestions for improvements that, when taken in total result in a vastly improved efficient operation. The amount of idea generation going on can be measured by the number of ideas per worker, the number of ideas suggested in total, the number of ideas implemented, or the proportion of ideas suggested that are implemented.

Backflush Costing

Traditional, normal and standard costing systems use the sequential tracking method for accounting costs. This involves recording journal entries in the same order as transactions occur, i.e. purchase, issue of materials, production, overheads absorption etc. Such systems are required in those manufacturing environment where inventory / WIP values are large.

An alternative approach to sequential tracking is Backflush Costing. It is a costing system that omits recording some or all of the journal entries relating to the cycle from purchase of direct materials to the sale of finished goods. The journal entries for the subsequent stages use normal or standard costs to work backward to flush out the cost in the cycle for which the journal entries were omitted earlier.

Since JIT systems operate in modern manufacturing environment characterized by low inventory and WIP values, usually also associated with low cost variances, the use of backflush costing is ideal when compared to sequential tracking method.

However the following issues must be corrected before effective implementation of Backflush Costing:

1. **Accurate Production reporting:** The total production figure entered into the system must be absolutely correct, or else the wrong component types and quantities will be subtracted from stock. This is a particular problem when there is high turnover or a low level of training to the production staff that records this information.
2. **Proper Scrap reporting:** All abnormal scrap must be diligently tracked and recorded. Otherwise, these materials will fall outside the backflushing system and will not be charged to inventory. Since scrap can occur anywhere in a production process, lack of attention by any of the production staff can result in an inaccurate inventory.

3. **Lot tracing:** Lot tracing is impossible under backflushing system. It is required when a manufacturer need to keep records of which production lots were used to create a product, in case all the items in a lot must be recalled. Only a picking system can adequately record this information. Some computer systems allow picking and backflushing system to coexist.
4. **Inventory accuracy:** The inventory balance may be too high at all times because the backflushing transaction that relieves inventory usually does so only once a day, during which time other inventory is sent to the production process. This makes it difficult to maintain an accurate set of inventory records in the warehouse. The success of backflushing system is directly related to a company's willingness to invest in a well-paid, experienced well-educated production staff that undergoes little turnover.

Business process re-engineering (Value Engineering)

Business process re-engineering involves examining business processes, current operations of organization and if possible, making substantial changes to current organizational operations. It means that apart from segregating all the activities into Value Added and Non Value Added Activities, and eliminating all Non Value added activities from the process, one should also consider, whether there is any better way of doing all the value added activities. In value engineering process, we try to find out better ways of doing all the activities so that cost control and cost reduction can be done effectively. For example purchase of materials is a business process consisting of activities such as purchase requisition, identifying suppliers, preparing purchase orders, mailing purchase orders and follow up. The process can be re-engineered by sending the production schedule direct to the suppliers and entering into contractual agreement to deliver materials according to the production schedule.

Some issues analysed during VE review are:

1. Elimination of unnecessary functions from the production process:

- This involves a detailed review of the entire manufacturing process to see if there are any steps that add no value to the product, e.g. interim quality review before further processing and final quality check.
- By eliminating unnecessary or duplicate functions, the firm can reduce their associated direct or overhead costs from the total product cost.
- The possible repercussions of elimination of any intermediate production function should be carefully analysed. The engineering team must be careful to develop work-around steps that eliminate the need for the original functions.

2. Elimination of unnecessary product qualities:

- The product quality should be studied with reference to the nature of its use, longevity of product's useful life.
- If some unnecessary quality e.g. excessive degree of sturdiness in consumable item (as opposed to a durable item) can be eliminated, it should be done in order to save significant material and other product costs.
- However, visible reduction in durability or reliability cannot be stretched too far. Hence any designs that have had their structural integrity reduced must be thoroughly tested to ensure that they meet all

design standards.

3. Design Minimisation:

- This involves the creation of a design that uses fewer parts or has fewer features.
- This approach is based on the assumption that a minimal design is easier to manufacture and assemble. Also, with fewer parts to purchase, less procurement expense is associated with the product.
- However, sometimes it would be less expensive to settle for a few extra standard parts that are more easily and cheaply obtained, rather than customised pre-fabricated parts, which complicate the assembly process.

4. Better product Design to suit manufacturing process:

- This is also known as Design For Manufacture and Assembly (DFMA) and involves the creation of a product design that can be created in only a specific manner. For example, a toner cartridge for a laser printer is designed so that it can be successfully inserted into the printer only when the sides of the cartridge are correctly aligned with the printer opening; all other attempts to insert the cartridge will fail.
- When used for the assembly of an entire product, this approach ensures that a product is not incorrectly manufactured or assembled, which would call for a costly disassembly or product recalls from customers who have received defective goods.

5. Substitution of Parts:

- This is also called as Component Parts Analysis. This approach encourages the search for less expensive components or materials that can replace more expensive parts currently used in a product design.
- Substitution of new parts is encouraged since new materials are being developed every year. However, parts substitution must be accompanied by a review of related changes elsewhere in the design and the consequent impact on total costs.
- This also involves allied analysis on tracking the intentions of suppliers to continue production of parts in the future. If parts are not available, they must be eliminated from the product design.

6. Combination of Steps:

- Sometimes, a careful review of all processes associated with a product reveals that some steps can be eliminated, other steps can be consolidated, or that several can be accomplished by one person, rather than having people in widely disparate parts of the production process to perform them. This is also known as Process Centering.
- By combining steps, transfer and queue time can be eliminated from the production process, which in turn reduces the chances of damage during transfers.

7. Search for better way of doing things:

- This seeks to answer a basic question – is there a better way?

- It strikes at the core of the cost reduction issue. It is a more general attempt to start from scratch and build a new product or process that is not based in any way on pre-existing ideas. Improvements resulting from this technique tend to have the largest favorable impact on cost reductions but can also be the most difficult for the organization to adopt, especially, if it has used other designs or systems for production.

Cost Control & Cost Reduction

Cost Control

Cost Control involves continuous comparisons of actual with the standards or budgets to regulate the former. Standards or budgets once set up are not attended during the period or until some mistakes are discovered in standards.

Cost reduction

Cost reduction is the achievement of real and permanent reduction in unit cost of products manufactured. It, therefore, continuously attempts to achieve genuine savings in cost of production distributing, selling and administration. It does not accept a standard or budget as or fined. It rather challenges the standards/ budgets continuously to make improvement in them. It attempts to excavate, the potential savings buried in the standards by continuous and planned efforts. Cost control relax that dynamic approach, it usually dealt with variances leaving the standards intact.

Difference between cost reduction and cost control:

| | Cost Control | Cost Reduction |
|---|---|---|
| 1 | It aims at achieving the established cost standards. | It aims at achieving a reduction in cost by using any suitable technique like value engineering, Work Study, Standardisation and Simplification, Variety reduction Quality measurement and research, Operations research, Market research, Job Evaluation and Merit Rating Improvement in design, Mechanisation and automation. |
| 2 | It is a preventive function. Costs are optimised before they are incurred. | It is a corrective function. It operates even when efficient cost control system exists. There is a room for reduction in achieved costs. |
| 3 | The main stress is on the present and past behaviour of costs. | The emphasis here is partly on present cost and largely on future costs. |
| 4 | It starts from establishing cost standards and attempts to keep the costs of operation of a process in line with the standards. | It challenges the standards forthwith and attempts to reduce cost on continuous basis. |
| 5 | It attempts to achieve the best possible results at the least cost under given conditions. | Under cost reduction, no condition is considered to be permanent, where a change will secure a lowest cost figure. |
| 6 | This process undertakes the competitive analysis of actual results with established norms. | This process finds out the substitutes by finding out new ways and means. |

| | | |
|---|---|---|
| 7 | It has limited applicability to those items of cost for which standards can be set. | It is universally applicable to all areas of business. It does not depend on standard though target amounts may be set. |
| 8 | Cost control sometimes lacks dynamic approach. | It is a continuous process involving dynamic approach. |

QUESTION:

Classify the following items under more appropriate category: Cost Control and Cost Reduction.

- (i) Costs exceeding budgets or standards are investigated.
- (ii) Prevention function
- (iii) Corrective function
- (iv) Measures to standardize for increasing productivity
- (v) Provision for proper storage facilities for materials
- (vi) Continuous comparison of actual with standards set
- (vii) Challenges the standards set
- (viii) Value analysis

2: STRATEGIC DECISION MAKING

PRICING DECISIONS

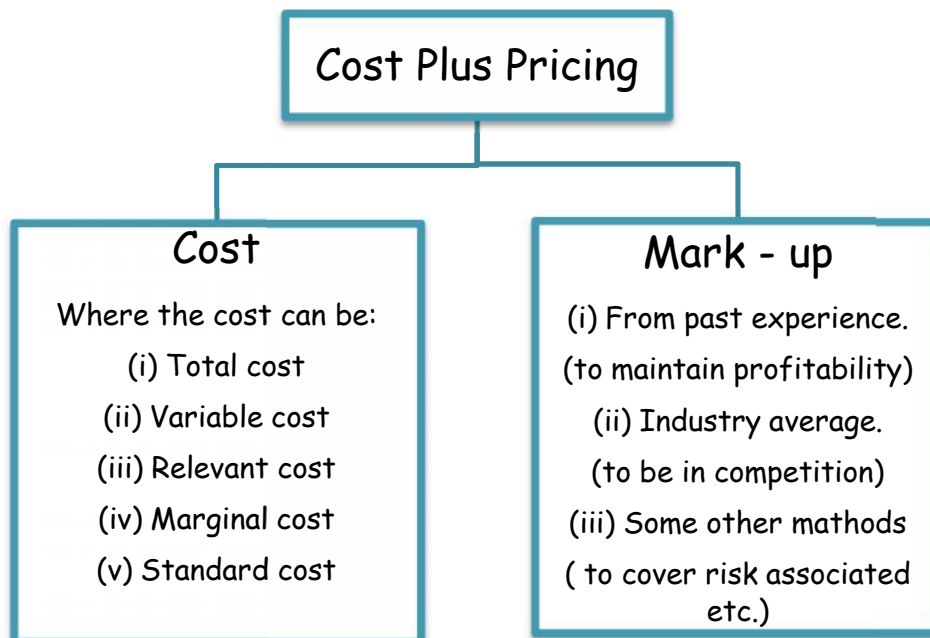
The general guidelines to be used in adopting a pricing policy are as under:

- The pricing policy should encourage optimum utilization of resources.
- The pricing policy should work towards a better balance between demand and supply.
- The pricing policy should promote exports.
- The pricing policy should serve as an incentive to the manufacturers to maximize production by adopting improved technology.
- The pricing policy should avoid adverse effects on the rest of the economy.

COST PLUS PRICING

It is the most widely used method of pricing a product as it ensures that the selling price is greater than the total cost of a product. This method helps business firms to generate profits and survive in the future. Under cost plus pricing the selling prices of a product are determined based on its estimated cost plus a fixed profit margin. Here 'cost' means full cost at current output and wage levels since these are regarded as most relevant in price determination.

The unit cost of the product can be determined by using different methods viz. total cost, manufacturing cost or variable / incremental cost. The percentage of mark up to be added to estimated cost also varies and depends upon the cost figures used. Cost and Mark up under different situations may be understood with the help of following diagram:



Advantages of Cost Plus pricing

1. When full costs plus basis is used for pricing, the firm earns a guaranteed contribution equivalent to fixed costs plus profit margin. Even, profit margin is taken as nil, fixed costs included in prices will guarantee minimum contribution.
2. Cost plus is a fair method of price fixation. The business executives are convinced that the price fixed will cover the cost.
3. If price is greater than cost, the risk is covered. This is true when normal expected capacity basis of cost estimation is used. The decision-maker may accept a pricing formula that seems reasonable for reducing uncertainty.
4. Cost plus pricing is ideal in the long run since there is no permanent opportunity cost. The effect of seasonal fluctuations is ironed out and prices are established based on normal long run costs.
5. Cost plus pricing does not mean that market forces are ignored. The mark up added to the cost to make a price reflect the well-established customs of trade, which guide the price fixer towards a competitive price.
6. For long-run pricing decisions, full costs of the product informs managers of the minimum costs to be recovered so as to continue in business rather than shut down.
7. Price fixation based on full costs of the product promotes price stability, because it limits the ability of sales person to cut prices. Price stability facilitates planning.
8. A full cost formula for pricing does not require a detailed analysis of cost-behaviour patterns to separate costs into fixed and variable components for each product. It is simple to operate.

Disadvantages of Cost plus pricing

1. Cost plus pricing ignores demand and fails to take into account the buyers' needs and willingness to pay, which govern the sales volume obtainable at each series of prices.
2. It fails to reflect competition adequately.
3. It assumes that the costs have been estimated with exact accuracy. This assumption is not true particularly in multi-product firms where the common costs are allocated arbitrarily.
4. For many decisions incremental cost plays a vital role in pricing, rather than full costs. This aspect is ignored. Also opportunity costs, most relevant for decision-making are summarily ignored.
5. Since the fixed overheads are apportioned on the basis of volume of production, the cost will be more if sales volume is less and vice-versa. The increase or decrease in sales volume is dependent on price. Thus it is a vicious circle- cost plus mark up is based on sales volume & sales volume is based on price.

In What Circumstances It May Be Justifiable To Sell At A Price Below Marginal Cost?

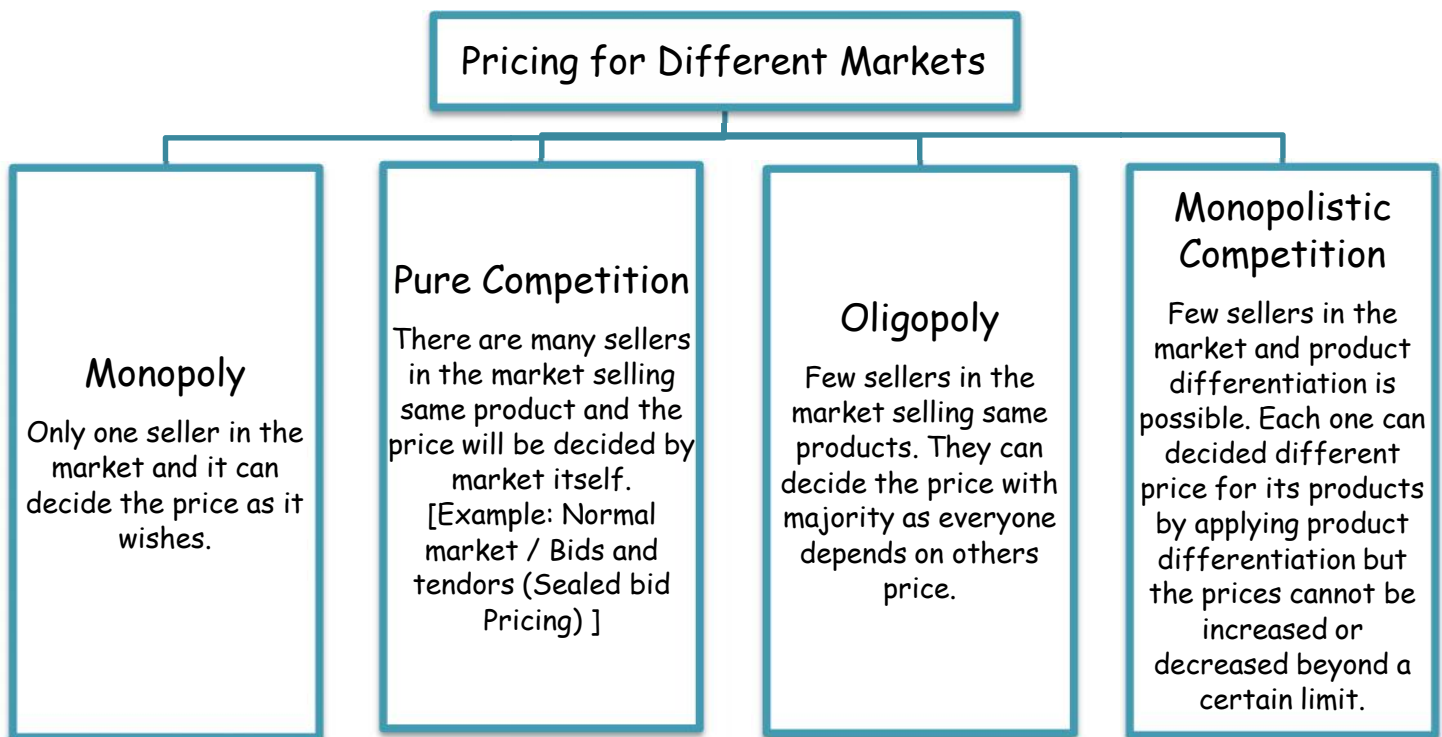
It may be justifiable to sell at a price below marginal cost for a limited period under the following circumstances:

- Where materials are of perishable nature.
- Where stocks have been accumulated in large quantities and the market prices have fallen.
- To popularize a new product

- Where such reduction enables the firm to boost the sale of other products having larger profit margin.
- To capture foreign markets
- To obviate shut down costs
- To retain future market.

COMPETITIVE PRICING

When a company fixes its price mainly on the consideration of what its competitors are charging, its pricing policy is called Competitive Pricing or competition-oriented pricing. The company need not charge the same price as charged by its competitors. But under such a pricing method the Company keeps its prices lower or higher than its competitors by a certain percentage. Competitive price so determined does not maintain a rigid relation between its prices, cost or demand. The Company's own costs or demand may change, but it will maintain its price because its competitors maintain their prices. Conversely, the Company will change its price when its competitors change their price, even if its own costs or demand have not altered. Pricing for different markets can be categorized as follows:



Going rate pricing

It is a competitive pricing method wherein a firm tries to keep its price at the average level charged by the industry. In a purely competitive market, there are many Firms selling a homogeneous product and price differentiation is not possible. The Firm selling a homogeneous product in a highly competitive market has very little choice about the pricing policy. So here one has to keep prices in accordance with the prices fixed by competitors.

Advantages:

- (a) Useful where it is difficult to measure costs
- (b) Yields fair return to all Firms in the industry
- (c) Most conducive for industry's harmony
- (d) Signifies the pricing practice in homogeneous product markets.

Going Rate Pricing in Pure Competition Market:

- (a) There is a market—determined price (Going Rate) for the product, which is established through the collective interaction of all Firms and the market or a multitude of knowledgeable buyers and sellers.
- (b) The Firm that charges more than the Going Rate would not be able to attract customers.
- (c) The Firm should not charge less than the Going Rate because it can sell its entire output at the Going Rate.
- (d) Thus, under highly competitive conditions in a homogeneous product market, the focus is on Cost Control and not on pricing decisions or marketing decisions.

Going Rate Pricing in Pure Oligopoly Market:

- (a) Pure Oligopoly is characterized by a few large Firms dominating the industry.
- (b) The Firms tend to charge the same price as is being charged by their competitors. Since there are only a few concerns, each Firm is quite aware of others' prices, and so are the buyers.

In the long run, since industry costs and demand change, the industry takes collective action to raise the price, or in rare cases, to lower the price. One Firm assumes the role of Price Leader and the others follow any change in price by the Leader.

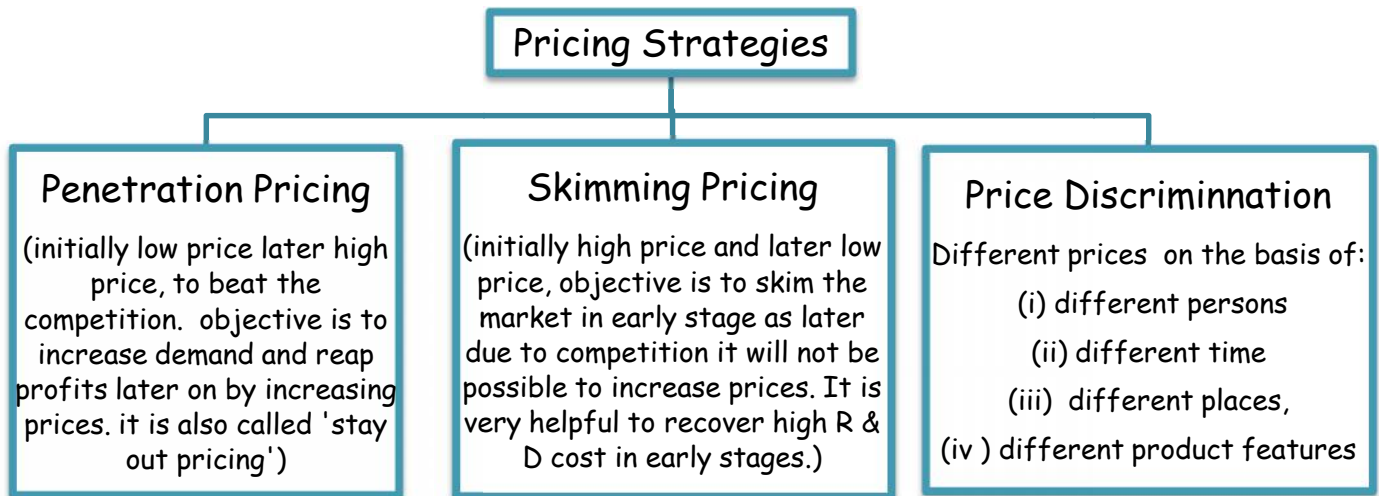
Sealed Bid Pricing

Competitive Pricing is prevalent when Firms compete for jobs on the basis of bids, while quoting for specific assignments or jobs e.g. Government Contracts, Specialized Work Contracts etc. The Bid constitutes the Firm's Offer Price. The quotation is generally based on the Incremental Costs plus a Reasonable Mark Up. The Firm's objective in bidding is to get the contract. This may mean that it hopes to fix its price lower than that of the other bidding Firms. Pricing is based on expectations of how Competitors will price rather than on rigid relation based on the concern's own costs or demand.

If a low price is quoted in order to win the contract, the Firm may lose its profits and worsen its situation. On the other hand, if it raises its prices, chances of gaining the contract may be reduced. Probability Analysis may be used to analyse the impact of various bid prices.

DIFFERENT PRICING STRATEGIES

Following are the different market strategies:



Penetration Pricing

This pricing policy is in favour of using a low price as the principal instrument for penetrating mass markets early. Penetration pricing means a price suitable for penetrating mass market as quickly as possible through lower price offers. This method is used for pricing a new product and to popularize it initially. Profits may not be earned in the initial stages. However, prices may be increased as and when the product is established and its demand picks up. The low price policy is introduced for the sake of long-term survival and profitability and hence it has to receive careful consideration before implementation. It needs an analysis of the scope for market expansion and hence considerable amount of research and forecasting is necessary before determining the price. Penetrating pricing policy can also be adopted at any stage of the product life cycle for products whose market is approached with low initial price. The use of this policy by the existing concerns will discourage the new concerns to enter the market.

The circumstances in which penetrating Pricing can be adopted are:

1. **Elastic demand:** The demand of the product is high, when price is low. Hence lower prices mean large volumes and hence more profits.
2. **Mass Production:** When there are substantial savings in large-scale production, increase in demand is sustained by the adoption of low pricing policy.
3. **Frighten off competition:** The prices fixed at a low level act as an entry barrier to the prospective competitors. The use of this policy by existing concerns will discourage the new concerns to enter the market. This pricing policy is also known as "stay-out-pricing"

Skimming Pricing

It is a policy of high prices during the early period of a product's existence and in the later years the prices are gradually reduced. This can be synchronized with high promotional expenditure and in the latter years the prices can be gradually reduced. It is an attempt to exploit those segments of the market that are relatively insensitive to price changes. For example, high initial price may be charged to take advantage of the novelty appeal of a new product when the demand is initially inelastic. It offers a safeguard against unexpected future increase in costs, or a large fall in demand after the novelty appeal has declined. This

policy should not be adopted when the substitutes are already available in the market. The reasons for following such a policy are:

1. The demand is likely to be inelastic in the earlier stages till the product is established in the market.
2. The change of high price in the initial periods serves to skim the cream of the market that is relatively insensitive to price. The gradual reduction in price in the later years will tend to increase the sales.
3. This method is preferred in the beginning because in the initial periods when the demand for the product is not known the price covers the initial cost of production.
4. High initial capital outlays needed for manufacture, results in high cost of production. In addition to this, the producer has to incur huge promotional activities resulting in increased costs. High initial prices will be able to finance the cost of production particularly when uncertainties block the usual sources of capital.

QUALITIES OF A GOOD PRICING POLICY

The pricing policy and the relative price structure should:

- (a) Provide an incentive to producer for adopting improved technology and maximising production;
- (b) Encourage optimum utilisation of resources;
- (c) Work towards better balance between demand and supply;
- (d) Promote exports; and
- (e) Avoid adverse effects on the rest of the economy.

Operating Costing: Difference Between Manufacturing And Service Sector

The difference between manufacturing and service sector is that in service sector there is no physical product that can be stored, assembled and valued. Services are rendered and cannot be stored up or placed in a vault. In service sector the cost of material is insignificant. For computing unit cost of services the most important cost would be professional's labour cost. Examples: Rendering a loan service, representing someone in court of law or selling an insurance policy are typical services performed by professionals. The direct labour cost is traceable to service rendered. In addition to labour cost the service sector like manufacturing sector incurs various overhead cost. In service sector those overhead costs, which are incurred for offering a service, are classified as service overheads (like factory overhead in manufacturing sector).

Costing Methods Used In Service Sector

1. **Job Costing:** In job costing method the cost of a particular service is obtained by assigning costs to a distinct identifiable service. In service sector like Accounting firm, Advertising campaigns etc. job costing method is used.
2. **Process Costing:** In process costing system the cost of a service is obtained by assigning costs to masses of similar unit and then computing unit cost on an average basis. Retail banking, Postal delivery, Credit card etc. uses process costing method.

3. **Hybrid costing:** Many companies use a method of costing which is neither job costing nor process costing method. They in fact uses a hybrid costing method which combines elements of both job costing and process costing methods.

Job Costing Method In Service Sector

The two costs, which are incurred in service sectors, are:

- Direct labour
- Service overheads

For ascertaining the price of a service provided by service sector if job-costing method is followed, the costs for each job are to be monitored continuously. There are two main uses of this job costs information:

- To guide decisions on job pricing
- To assist in cost planning and cost control

The five steps, which are generally adopted for assigning costs to individual jobs, are as follows:

1. **Identify the job that is chosen as cost object:** For instance, litigation work for Motorola India Ltd. By Dua & Associates by assuming that work requires 100 budgeted hours of professional labour.
2. **Identify the direct cost categories for the job:** In the above example the professional hours required for doing litigation work is a direct cost.
3. **Identify indirect costs (overheads) associated with the job:** This step requires identifications of indirect costs incurred for providing services. These costs may include the costs of support labour, computer time, travel, telephone/fax machine, photocopying etc.
4. **Select the cost allocation base to be used in assigning each indirect cost to the job:** This step requires the selection of cost allocation base that has a cause and effect relationship between changes in it and changes in the level of indirect costs. The allocation base suitable for allocating indirect cost of law firm is professional labour hours.
5. **Identify the rate per unit of the cost allocation base used to allocate cost to the job:** The budgeted indirect cost allocation rate is computed by using following formula.

Customer Costing In Service Sector

Customer Costing in service sector: The customer costing is a new approach to management. The theme of this approach is customer satisfaction. In some service industries such as public relations, the specific output of industry may be difficult to identify and even more difficult to quantify. Further where there are multiple customers, identifying support activities i.e. common costs with particular customer may be more problematic. In such cases, it is important to cost customers. An ABC analysis of customer's profitability provides valuable information to help management in pricing customer. Consider a banking sector A bank's activities for customer will include the following types of activities. These are:

- (i) Stopping a cheque
- (ii) Withdrawal of cash
- (iii) Updation of pass book
- (iv) Issue of duplicate pass book
- (v) Returning a cheque because of insufficient funds
- (vi) Clearing of a customer cheque.

Different customers or categories of customers use different amount of these activities and so customer profiles can be build up and customer can be charged according to the cost to serve them.

For customer costing purpose, the costs are divided into following categories. These are:

1. **Customer Specific costs:** These are direct and indirect cost of providing service to customer plus customer related cost assigned to each customer. For example cost of express courier service to a client/customer who requests overnight delivery of some agreement.
2. **Customer-line categories:** These are the costs which are broken into the broad categories of customers and not individual customer.
3. **Company costs:** These are those costs which are not allocated to either customer line or individual customers but charge to company. The example is the cost of advertisement to promote sale of service.

Pricing By Service Sector

The service sector follows a different approach for pricing their service. Although a service has no physical existence it must be priced and billed to customers. Most service organizations use a form of time and material pricing to arrive at the price of a service. Service companies such as appliance repair shops, automobile repair business arrive at prices by using two computations, one for labour and other for materials and parts. As with a cost based approach a markup percentage is used to add the cost of overhead to the direct cost of labour, materials and parts. If materials and parts are not part of service being performed, then only direct labour costs are used as basis for determining price. For professionals such as accountants and consultants a factor representing all overhead costs is applied to the base labour costs to establish a price for the services.

Transfer Pricing: Meaning

Transfer pricing technique is a major issue in the current business world. As the scope of business is increasing day by day, it is not possible for upper level managers to manage such a large organization. So for the purpose of better management and control organizations are divided in to smaller divisions, each having an independent divisional manager. Sometimes, performance of divisional managers is linked with the profits earned by their respective divisions. In such a situation each divisional manager wants to increase profits of his respective division. Now a problem arises where output of a particular division can be the input for a particular division, in this situation the problem is to decide proper transfer price as improper price may impact the profitability of both the divisions and give birth to various conflicts. Divisional managers may not be interested to transfer goods internally; instead they can choose to deal with external parties and may

adversely impact the profitability of organization as a whole. That's why it is very important to decide fair transfer prices. Transfer Pricing plays a very important in international taxation also, as by fixing fair transfer prices one can avoid a lot of tax burden.

Objectives Of Transfer Pricing

The main objectives of intra-company transfer pricing are:

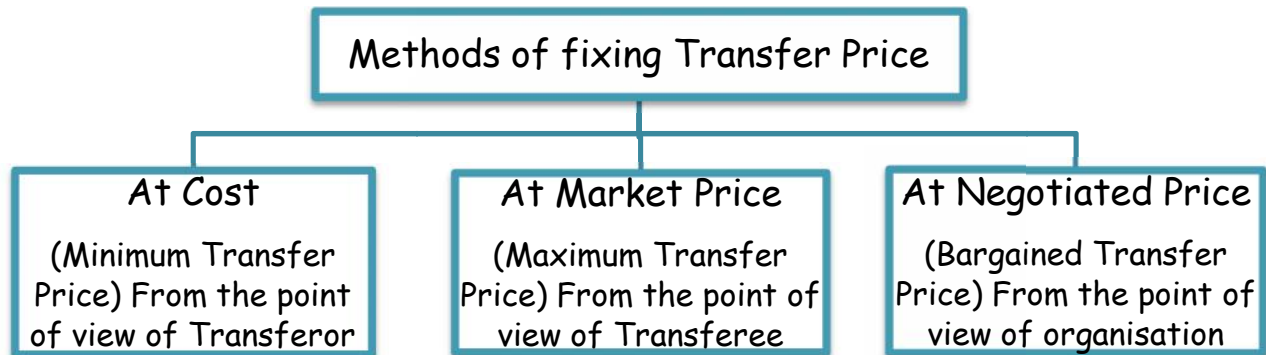
1. **Overall Company Profitability:** The focus of transfer pricing is to foster a commercial attitude in the managers who are in charge of profit centres. This objective compels the units to improve their profit position. Improvement in each sub-unit's profit results in overall company profitability.
2. **Full Capacity Utilisation:** There may be certain divisions that have spare capacity. Such divisions should be motivated to utilize their balance capacity in the optimal manner. The focus is to optimize the profit of the concern over a short period of time, by stressing on maximum utilization of plant capacity.
3. **Optimum Resource Utilisation:** The resources of the Company, whether they are abundant or scarce, have to be used in the most optimal manner. This is a long term objective. The allocation of resources is based on relative performance of various profit centres, which in turn are influenced by transfer pricing policies.

Disadvantages of Treating Divisions As Profit Centres

The Possible disadvantages of treating divisions as profit centres are as follows:

1. Divisions may compete with each other and may take decisions to increase profits at the expense of other divisions thereby overemphasizing short term results.
2. It may adversely affect co-operation between the divisions and lead to lack of harmony in achieving organizational goals of the company. Thus it is hard to achieve the objective of goal congruence.
3. It may lead to reduction in the company's overall total profits.
4. The cost of activities, which are common to all divisions, may be greater for decentralized structure than centralized structure. It may thus result in duplication of staff activities.
5. Top management loses control by delegating decision making to divisional managers.
6. There are risks of mistakes committed by the divisional managers, which the top management, may avoid.
7. Series of control reports prepared for several departments may not be effective from the point of view of top management.
8. It may under utilize corporate competence.
9. It leads to complications associated with transfer pricing problems.
10. It becomes difficult to identify and defines precisely suitable profit centres.
11. It confuses division's results with manager's performance.

Methods Of Fixing Transfer Price



Negotiated Transfer Price

Negotiated Transfer Pricing refers to the determination of transfer prices based on active participation, involvement, co-ordination and agreement of the managers of the transferring and recipient divisions. In this method each decentralized unit is considered as an independent unit. Such units decide the transfer price by, negotiations or bargaining.

Divisional Managers have full freedom to purchase their requirement from outside if the prices quoted by the transferring division are not acceptable to them.

Advantages:

1. **Proper Decision Making:** Negotiated prices lead to business like attitude amongst divisions of the company. The buying division may purchase from outside sources if the outside prices are lower than the internal division's price.
2. **Autonomy and Motivation Value:** Each sub-unit is considered as an independent unit. Buyers and Sellers are completely free to deal outside the Company. This promotes sub-unit autonomy and motivates managers.
3. **Overall Company Profitability:** Through properly direct negotiations, managers will be able to determine the appropriate transfer prices that satisfy the requirements of the divisions and are in the best interest of the Company as a whole.

Limitations:

1. **Sub-optimal:** The agreed transfer price may depend on the negotiating skills and bargaining powers of the managers involved. The final result may not always be optimal.
2. **Conflicts:** Rather than agreement on transfer prices, negotiations can lead to conflict between divisions and may require top-management mediation.
3. **Defeat of Performance evaluation criteria:** Transfer prices dependent on manager's negotiation skills will defeat the very purpose of performance evaluation.
4. **Time and Cost:** Negotiations are time consuming for the manager involved, particularly when the number of transactions and interdependencies are large.

In order to have an effective system of transfer pricing; the following points should be kept in view;

1. Price of all transfer in and out of a profit centre should be determined by negotiation between the buyer and the seller.
2. Negotiations should have access to full data on alternative source and markets and to public and private information about market prices.
3. Buyers and sellers should be completely free to deal outside the company.

Criteria For Setting Transfer Prices

1. **Goal Congruence:** Transfer prices should help in achieving the organisation's goals and objectives as a whole, thereby promoting goal congruence. This will happen when actions those divisional managers take to improve the reported profit of their divisions also improves the profit of the company as whole.
2. **Management Effort:** Transfer prices should aid in accomplishing the Company's strategies and in the promotion of a bolstered management effort to accomplish the same. Top management's initiative and active co-ordination is essential.
3. **Segment performance Evaluation:** The selection of transfer pricing system should necessarily facilitate the top management of an enterprise to evaluate the performance of the individual sub-units and their respective leads.
4. **Sub-unit autonomy:** Transfer prices promote the autonomy of the sub-units in decision making. Thereby the sub-unit heads should be left on their own to transact with outside agencies or with other sub-units of the organization to maximize their profit. Divisional autonomy should not be undermined.
5. **Motivation Value:** The transfer pricing system should provide information that motivates divisional managers to make good economic decisions.

Transfer Pricing Conflicts Between Division And Company As A Whole

Objective and conflicts:

The criteria for fixing transfer prices are:

- (a) Goal Congruence in decision-making,
- (b) Management Effort
- (c) Segment Performance Evaluation and
- (d) Sub-unit autonomy and motivation value.

However, no single transfer price can serve all of those criteria. They often conflict and managers are forced to make trade-offs.

Some situations of conflicts between objectives are:

1. **Goal Congruence vs. Performance Evaluation:** The transfer price that leads to the short-run optimal economic decision is relevant cost. If the transferring division has excess capacity, this cost will be equal to variable cost only (since opportunity costs are Nil) The transferring divisions will not recover any of its fixed costs when transfers are made at variable costs and will therefore report a loss.
2. **Goal Congruence vs. Divisional autonomy:** In case of failure of a division to achieve the objective of 'goal congruence' the management of the company may dictate their 'transfer price' If a transfer price

is imposed on the manager of the supplying division, the concept of divisional autonomy and decentralization is undermined.

3. **Performance Evaluation vs. Profitability:** A transfer price that may be satisfactory for evaluating divisional performance may lead to make sub-optimal decisions when viewed from the overall company perspective.

Conflicts between Divisions and Company as a whole: If divisional managers are given “absolute free hand” in decision making on transfer prices, there is a possibility that divisional goals may be pursued, ignoring overall company interest. This may force the top management to interfere in decision making. However, interference of top management and “dictating a transfer price” on the divisions is usually the main basis of conflict between a division and the company as a whole.

RELEVANT COSTING

Relevant costing approach is used in decision making. This technique states that all the costs that are used for product costing purposes are not necessarily important for decision making also. There are some costs that should be ignored or taken additionally while decision making. In this chapter, we will learn to identify all the costs that are important for decision making.

Relevant Costs: The costs, which are relevant and useful for decision-making purposes.

1. **Marginal Cost** – Marginal cost is the total variable cost i.e. prime cost plus variable overheads. It is assumed that variable cost varies directly with production whereas fixed cost remains fixed irrespective of volume of production. Marginal cost is a relevant cost for decision taking, as this cost will be incurred in future for additional units of production.
2. **Differential Cost** – It is the change in costs due to change in the level of activity or pattern or method of production. Where the change results in increase in cost it is called incremental cost, whereas if costs are reduced due to increase of output, the difference is called decremental costs. The differential costs are relevant costs.
3. **Opportunity Cost** – This cost refers to the value of sacrifice made or benefit of opportunity foregone in accepting an alternative course of action. It is the opportunity lost by diversion of an input factor from one use to another. It is the measure of the benefit of opportunity foregone.

The opportunity cost is helpful to managers in evaluating the various alternatives available when multiple inputs can be employed for multiple uses. These inputs may nevertheless have a cost and this is measured by the sacrifice made by the alternative action in course of choosing another alternatives.

For example:

- 1) A firm financing its expansion plans by withdrawing money from its bank deposits. In such a case the loss of interest on the bank deposit is the opportunity cost for carrying out the expansion plan.
- 2) The opportunity cost of using a machine to produce a particular product is the earning forgone that would have been possible if the machine was used to produce other products.
- 3) The opportunity cost of one's time is the earning which he would have earned from his

profession.

Opportunity cost is a relevant cost where alternatives are available. However, opportunity cost does not find any place in formal accounts and is computed only for comparison purposes.

4. **Discretionary costs** – These are “escapable” or “avoidable” costs. In other words, these are costs, which are not essential for the accomplishment of a managerial objective.
5. **Replacement Cost** – It is the cost at which there could be purchase of an asset or material identical to that which is being replaced or devalued. It is the cost of replacement at current market price and is relevant for decision-making.
6. **Imputed Costs** – These are notional costs appearing in the cost accounts only e.g. notional rent charges, interest on capital for which no interest has been paid. These are relevant costs for decision-making. Where alternative capital investment projects are being evaluated, it is necessary to consider the Imputed interest on capital before a decision is arrived at as to which is the most profitable project.
7. **Out-of pocket cost** – These are the costs, which entail current or near future cash outlays for the decision at hand as opposed to cost, which does not require any cash outlay (e.g. depreciation). Such costs are relevant for decision-making, as these will occur in near future. This cost concept is a short-run concept and is used in decisions relating to fixation of selling price in recession, make or buy, etc. Out-of-pocket costs can be avoided or saved if a particular proposal under consideration is not accepted.
8. **Explicit Costs** – These are also known as out of pocket costs. They refer to costs involving immediate payment of cash. Salaries, wages, postage & telegram, printing & stationery, interest on loan etc. are some examples of explicit costs involving immediate cash payment.

Irrelevant Costs: The costs, which are not relevant or useful for decision-making.

1. **Sunk Cost** – It is the cost, which has already been incurred or sunk in the past. It is not relevant for decision-making and is caused by complete abandonment as against temporary shutdown. Thus if a firm has obsolete stock of materials amounting to Rs.50,000 which can be sold as scrap for Rs.5,000 or can be utilised in a special job, the value of opening stock of Rs.50,000 is a sunk cost and is not relevant for decision-making.
2. **Committed Cost** – A cost, which has been committed by the management, is not relevant for decision making. This should be contrasted with discretionary costs, which are avoidable costs.
3. **Absorbed Fixed Cost** – Fixed costs which do not change due to increase or decrease in activity is irrelevant for decision-making. Although such fixed costs are absorbed in cost of production on a normal rate, such costs are irrelevant for managerial decision-making. However if fixed costs are specific, they become relevant for decision-making.
4. **Implicit Costs** – These costs do not involve any immediate cash payment. They are not recorded in the books of account. They are also known as economic costs.

5. **Estimated cost** – The expected cost of manufacture or acquisition, often in terms of a unit of product computed on the basis of information available in advance of actual production or purchase”. Estimated costs are prospective costs since they refer to prediction of costs.

QUESTION:

State the type of cost in the following cases:

- (i) Cost associate with the acquisition and conversion of materials in to finished product.
- (ii) Cost arising from a prior decision which cannot be changed in the short run.
- (iii) Increase in cost resulting from selection of one alternative instead of another.
- (iv) Rent paid for a factory building which is temporarily closed.

Sunk cost is irrelevant in making decisions, but irrelevant costs are not sunk costs

Sunk costs are costs that have been created by a decision made in the past and that cannot be changed by any decision that will be made in the future. For example, the written down value of assets previously purchased are sunk costs. Sunk costs are not relevant for decision making because they are past costs.

But not all irrelevant costs are sunk costs. For example, a comparison of two alternative production methods may result in identical direct material costs for both the alternatives. In this case, the direct material cost will remain the same whichever alternative is chosen. In this situation, though direct material cost is the future cost to be incurred in accordance with the production, it is irrelevant, but, it is not a sunk cost.

INCREMENTAL COST TECHNIQUE

It is a technique used in the preparation of ad-hoc information in which only cost and income differences between alternative courses of action are taken into consideration. This technique is applicable to situations where fixed costs alter.

The essential pre-requisite for making managerial decisions by using incremental cost technique, is to compare the incremental costs with incremental revenues. So long as the incremental revenue is greater than incremental costs, the decision should be in favour of the proposal.

Applications of incremental cost techniques in making managerial decisions

The important areas in which incremental cost analysis could be used for managerial decision making are as under:

- (i) Introduction of a new product
- (ii) Discontinuing a product, suspending or closing down a segment of the business
- (iii) Whether to process a product further or not
- (iv) Acceptance of an additional order form a special customer at lower than existing price
- (v) Opening of new sales territory and branch.
- (vi) Investment plan out of multiple alternatives.
- (vii) Make or buy decisions
- (viii) Submitting tenders

- (ix) Lease or buy decisions
- (x) Equipment replacement decisions

Shut down costs

Those costs that continue to be, incurred even when a plant is temporarily shutdown, e.g. rent, rates, depreciation, etc. These costs cannot be eliminated with the closure of the plant. In other words, all fixed costs which cannot be avoided during the temporary closure of a plant will be known as shut down costs.

Committed Fixed Costs & Discretionary Fixed Costs

| Committed Fixed Costs | Discretionary Fixed Costs |
|---|---|
| These are costs that arise from the possession of: <ul style="list-style-type: none"> ❖ Plant, building and equipment (e.g. depreciation rent, taxes insurance premium etc.) or ❖ A basic organization (e.g. salaries of staff) | These are costs incurred as a result of management's discretion. <ul style="list-style-type: none"> ❖ It arises from periodic (usually yearly) decisions regarding the maximum outlay to be incurred, and ❖ It is not tied to a clear cause and effect relationship between inputs and outputs. |
| These costs remain unaffected by any short-term changes in the volume of production. | These cannot be changed in the very short-run. |
| Any reduction in committed fixed costs under normal activities of the concern would have adverse repercussions on the concern's long term objectives. | Discretionary fixed Cost can change from year to year, without disturbing the long-term objectives. |
| Such costs cannot be controlled. | These costs are controllable. |

Control over discretionary costs: To control discretionary costs control points/ parameters may be established. But these points need to be divided individually. For research and development function to control discretionary costs, dates may be established for submitting major reports to management. For advertising and sales promotion, such costs may be controlled by pre-setting targets. In the case of employee's benefits, discretionary costs may be controlled by calling a meeting of employees union and making them aware that the company would meet only the fixed costs and the variable costs should be met by them

3: BUDGETARY CONTROL & STANDARD COSTING

BUDGETARY CONTROL: MEANING

Budgetary control is also a technique of controlling. In this technique we try to set up control on various tasks within the organization by drafting different types of budgets for all these activities in advance, so that actual performance can be monitored easily and the responsibilities of the persons concerned can be fixed. Budget is basically a statement prepared in advance for a specified task or activity that is to be performed within a specific period of time. We set control over cost and other activities within the organization by preparing various kinds of budgets in this technique. Here we take total approach for control point of view, instead of taking per unit approach unlike standard costing.

OBJECTIVES OF BUDGETARY CONTROL

1. Portraying with precision, the overall aims of the business and determining targets of performance for each section or department of the business.
2. Laying down the responsibilities of each of the executives and other personnel so that everyone knows what is expected of him and how he will be judged.
3. Providing basis for the comparison of actual performance with the predetermined targets and investigation of deviation, if any, of actual performance and expenses from the budgeted figures. It helps to take timely corrective measures.
4. Ensuring the best use of all available resources to maximize profit or production, subject to the limiting factors.
5. Coordinating the various activities of the business and centralizing control, but also facility for management to decentralize responsibility and delegate authority.
6. Engendering a spirit of careful forethought, assessment of what is possible and an attempt at it. It leads to dynamism without recklessness. It also helps to draw up long range plans with a fair measure of accuracy.
7. Providing a basis for revision of current and future policies. Providing a yardstick against which actual results can be compared

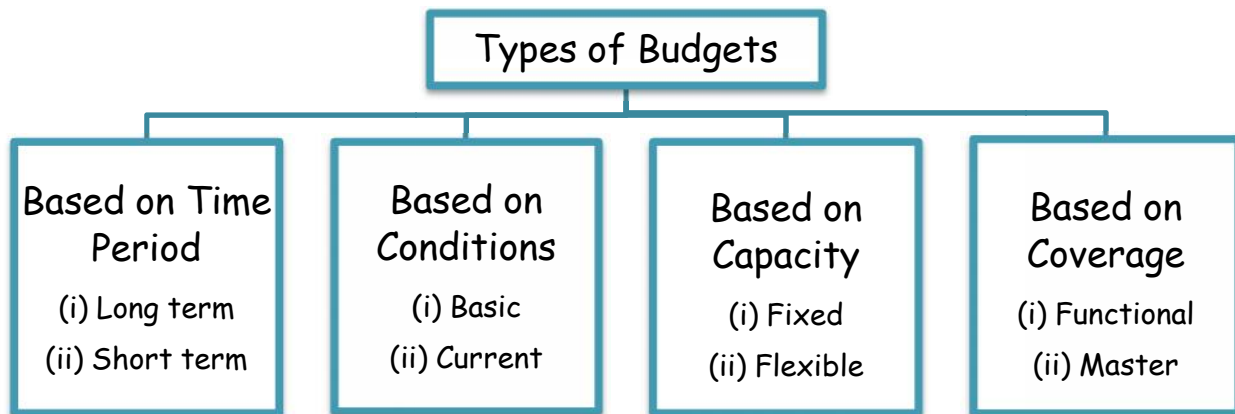
ADVANTAGES OF BUDGETARY CONTROL SYSTEM

1. It enables the management to conduct its business activities in an efficient manner. Effective utilization of scarce resources, i.e. men, material, machinery, methods and money – is made possible.
2. It is powerful instrument used by business houses for the control of their expenditure. It inculcates the feeling of cost consciousness among workers.
3. It provides a yardstick for measuring and evaluating the performance of individuals and their departments.
4. It creates suitable conditions for the implementation of standard costing system in a business organization. It reveals the deviations to management from the budgeted figures after making a comparison with actual figures.
5. It helps in the review of current trends and framing of future policies.

LIMITATIONS OF BUDGETARY CONTROL SYSTEM

1. Budgets may or may not be true, as they are based on estimates. The assumptions about future events may or may not actually happen.
2. Budgets are considered as rigid document. Too much emphasis on budgets may affect day-to-day operations and ignores the dynamic state of organization functioning.
3. Mere budgeting cannot lead to profitability. Budgets cannot be executed automatically. It may create a false sense of security that everything has been taken care of in the budgets.
4. Staff co-operation is usually not available during budgetary control exercise.
5. The introduction and implementation of the system may be expensive.

TYPES OF BUDGETS



FLEXIBLE BUDGET

It is a budget, which is designed to change in relation to level of activity by recognizing the difference between fixed, semi-variable and variable costs. The need for preparation of flexible budgets arises in the following circumstances:

- Seasonal fluctuations in sales and/or production
- An industry which is influenced by changes in fashion; and
- General change in sales
- In the case of new business venture due to its typical nature it may be difficult to forecast the demand of a product accurately.
- In the case of labour intensive industry where the production of the concern is dependent upon the availability of labour.

STEPS INVOLVED IN THE PREPARATION OF BUDGETS

1. **Definition of Objectives:** Objectives should be defined precisely. They should be written out; areas of control de-marketed and items of revenue and expenditure to be covered by the budget stated. This will give a clear understanding of the plan and its scope to all those who must cooperate to make it a success.
2. **Identification of key (or principle budget) factor:** A key factor represents source whose availability is less than its requirement. Such resource constraints put a limit on the organization objective of maximum profitability. Some examples are lack of sales demand, rationing of raw material, labour shortage, plant capacity etc. For proper budgeting, the key factor must be located and estimated properly.
3. **Budget Committee and Controller:** Formulation of a budget usually requires whole time services of a senior executive; he must be assisted in this work by a Budget Committee, consisting of all the heads of department along with the Managing Director as the Chairman. The Controller is responsible for coordination and development of budget programmes and preparing the Budget Manual.
4. **Budget Manual:** The Budget manual is a schedule, document or booklet, which shows in a written form, the budgeting organization and procedure. The manual should be well written and indexed so that a copy thereof may be given to each department head for guidance.
5. **Budget period:** The period covered by a budget is known as budget period. Normally a calendar year or a period coterminous with the financial year is adopted as the Budget Period. It is then sub-divided into shorter periods – it may be months or quarters or such period as coincide with period of trading activity.
6. **Standard of activity or output:** The standards of activity levels for future period should be laid down. These are generally based on past statistics, known market changes and current conditions and forecast of future situations. In a progressive business, the achievement of a year must exceed those of earlier years. In budgeting, fixing the budget of sales and capital expenditure are most important since these budgets determine the extent of development activity.

ZERO BASE BUDGETING (ZBB)

Zero based budgeting is a decision oriented approach. Zero-base budgeting is so called because it requires each budget to be prepared and justified from zero, instead of simple using last year's budget as a base. In Zero Based budgeting no reference is made to previous level expenditure. Incremental level of expenditures on each activity is evaluated according to the resulting incremental benefits. Available resources are then allocated where they can be used most effectively.

CIMA has defined it "as a method of budgeting whereby all activities are revaluated each time a budget is set"

It is an expenditure control device where each divisional head has to justify the requirement of funds for

each head of expenditure and prepare the budget accordingly, without reference to the past budget or achievements. It is an operating planning and budgeting process, which requires each manager to justify his entire budget requests in detail from “scratch” (hence zero-base).

Features

1. **Wholistic:** The technique deals practically with all the elements of budget proposals.
2. **Analytical:** A critical evaluation of all the ongoing activities is also done afresh together with new proposals. Each manager has to justify why he should spend any money at all.
3. **Priority Based:** This approach requires that all activities be identified as decision on packages, which would be evaluated by systematic analysis and ranked in order of importance.
4. **Review Based:** an organisation should not only make decisions about the proposed new- programmes but it should also from time to time, review the “utility” and “appropriateness” of the existing programmes.
5. **Rational:** It allows for budget reductions and expansions in a rational manner and allows re- allocation of resources from low to high priority programme.

Advantages of ZBB

1. **Priority allocation:** It provides a systematic approach for the evaluation of different activities and ranks them in order of preference for the allocation of scarce resource.
2. **Maximum Efficiency:** It ensures that the various functions undertaken by the organization are critical for the achievement of its objectives and are being performed in the best possible way.
3. **Cost Benefit Analysis:** It provides an opportunity to the management to allocate resource for various cost benefit analysis. The chances of arbitrary cuts and enhancement are thus avoided.
4. **Elimination of wasteful expenditure:** The areas of wasteful expenditure can be easily identified and eliminated.
5. **Goal Congruence:** Department budgets are closely linked with corporate objectives.
6. **Management by Objectives:** The technique can also be used for the introduction and implementation of the system of ‘management by objective’ Thus it cannot only be used for fulfillment of the objectives of traditional budgeting but it can also be used for a variety of other purposes.

Limitations of ZBB

1. **Lack of Coordination:** Various operational problems are likely to be faced in implementing the technique of ZBB. It requires the wholehearted support from top management.
2. **Old is Gold Attitude:** Generally managers are reluctant to start afresh. They tend to plan for future just by reference to past actions and budgets.
3. **Time Consuming:** It is time consuming as well as costly.
4. **Lack of trained staff:** It needs properly trained managerial personnel to do the required job.

Steps in Zero Base Budgeting (ZBB)

ZBB involves the following:

1. **Objectives:** Determination of a set of objectives is one of pre-requisite and essential step in the direction of ZBB technique.
2. **Coverage:** Deciding about the extent to which the technique of ZBB is to be applied, whether in all areas of organization's activities or only in a few selected areas on trial basis.
3. **Decision Areas:** Identify those areas where decisions are required to be taken.
4. **Ranking:** Developing decision – package and ranking them in order of preference.
5. **Budgeting:** Preparation of budget, that is translating decision packages into practicable units items and allocating financial resources.

QUESTION:

In each of the following independent situations, state with a brief reason whether 'Zero base budgeting' (ZBB) or 'Traditional budgeting' (TB) would be more appropriate for year II.

- (i) A company is producing certain product has done extensive ZBB exercise in year I. The activity level is expected to marginally increase in year II.
- (ii) The sales manager of a company selling three products has the intuitive feeling that in year II, sales will increase for one product and decrease for the other two. His expectation cannot be substantiated with figures.
- (iii) The top management would like to delegate responsibility to the functional managers for their results during the year.
- (iv) Resources are heavily constrained and allocation for budget requirements are very strict.

PERFORMANCE BUDGETING

Performance Budgeting provide a meaningful relationship between estimated inputs and expected outputs as an integral part of the budgeting system. 'A performance budget is one which presents the purposes and objectives for which funds are required, the costs of the programmes proposed for achieving those objectives, and quantities data measuring the accomplishments and work performed under each programme. Thus PB is a technique of presenting budgets for costs and revenues in terms of functions. Programmes and activities are correlating the physical and financial aspect of the individual items comprising the budget.

It is the process of analysing, identifying, simplifying and crystallizing specific performance objectives, of a job to be achieved over a period, within the framework of organizational objectives, the purposes and objectives of the job. The technique is characterised by its specific direction towards the business objectives of the organization.

Features and Advantages:

1. Performance budgeting lays immediate stress on the achievement of specific goals over a period of time.
2. It aims at a continuous growth of the organization so that it continues to meet the dynamic needs of its growing clientele.

3. It enables the organization to be sensitive and adaptive, preventing it from developing rigidities, which may retard the process of growth.
4. It requires the preparation of periodic performance reports, which compare budget and actual performance to find out existing variances.

IMPORTANT CONSIDERATIONS IN PERFORMANCE REPORTING

The important considerations in drawing up of reports and determining their scope are the following:

| | |
|-----------------|--|
| Significance | <ul style="list-style-type: none"> ❖ Reliability – Are the facts in the report reliable? ❖ Cause or Effect – Does it either call for action or demonstrate the effect of action? |
| Timeliness | <ul style="list-style-type: none"> ❖ Latest time – How late can the information be and still be of use? ❖ Earliest Time – What is the earliest moment at which it could be used if it were available? ❖ Frequency – How frequently is it required? |
| Accuracy | <ul style="list-style-type: none"> ❖ How small should be an inaccuracy, which does not alter the significance of the information. ❖ What doubtful elements does it contain? Could any of them or all together make a material difference? |
| Appropriateness | <ul style="list-style-type: none"> ❖ Receiver – is the recipient the right person to take any action that is needed? ❖ Additional Information – Is there any other information which is required to support the information to anyone else jointly interested? |
| Discrimination | <ul style="list-style-type: none"> ❖ Will anything be lost by omitting the item? ❖ Will any of the items gain from the omission? ❖ Is the responsibility for suppressing the item acceptable? |
| Presentation | <ul style="list-style-type: none"> ❖ Clarity – Is the report clear and unbiased? ❖ Form – Is the form suitable to the subject and to the recipient ? |

PERFORMANCE REPORTS

Top Management: (including Board of Directors and financial managers)

1. Balance Sheet
2. Profit & Loss Statement
3. Position of Stock;
4. Disposition of funds or working capital
5. Capital expenditure and forward commitments together with progress of projects in hand. Cash flow statements;
6. Sales, production, and other appropriate statistics

Sales Management

1. Actual sales compared with budgeted sales to measure performance by (a) products; (b) territories; (c) individual salesmen; and (d) customers.
2. Standard profit and loss, product-wise (a) for fixing selling prices and (b) to concentrate on sales of most profitable products.
3. Selling expenses in relation to budget and sales value analysed by (a) products; (b) territories; (c)

individual salesmen; and (d) customers

4. Bad debts and accounts, which are slow and difficult in collection. Status reports on new or doubtful customers.

Production management

1. **To Buyer:** Price variations on purchases analysed by commodities.
2. **To Foreman:** Operational Efficiency for individual operators duly summarized as departmental averages. Labour utilization report and causes of lost time and controllable time; Indirect shop expenses against the standard allowed; and Scrap report

Works Manager

1. Departmental operating statement
2. General works operating statements (Expenses relating to all works expenses not directly allocable or controllable by departments);
3. Plant utilization report;
4. Department scrap report; and
5. Material usage report

Special Reports: These are prepared at the request of general management or at the initiative of the management accountant. Some examples are:

1. Taxation legislation and its effect on profits estimates of the earning capacity of a new project Break-even analysis
2. Capital budgeting decisions
3. Special pricing analysis
4. Make or buy certain components

BENCHMARKING

Benchmarking is the process of identifying and learning from the best practices anywhere in the world. It is a powerful tool for continuous improvement in performance. It involves comparing firm's products, services or activities against other best performing organization, either internal or external to the firm. The objective is to find out how the product, service or activity can be improved and ensure that the improvements are implemented. It attempts to identify an activity that needs to be improved and finding a non-rival organization that is considered to represent world-class best practice and studying how it performs the activity.

Different types of Bench marking

1. **Competitive Benchmarking:** It involves the comparison of one's own products, processes and business results with that of competitors. Bench marking partners are drawn from the same industry. To protect confidentiality it is common for the companies to undertake this type of benchmarking through associations of third parties.
2. **Strategic Benchmarking:** It involves a systematic process by which a company seeks to improve its

overall performance by examining the long-term strategies. It involves comparing high-level aspects such as developing new products and services, core competencies etc. It is similar to process benchmarking in nature but differs in its scope and depth.

3. **Global benchmarking:** It is a benchmarking through which distinction in international culture, business processes and trade practices across companies are bridged and their ramification for business process improvement are understood and utilized. Globalization and advances in information technology leads to use of this type of benchmarking.
4. **Process benchmarking:** It involves the comparison of an organisation's critical business processes and operations against best practice organization that performs similar work or deliver similar services.
5. **Functional benchmarking:** This is used when organizations look to benchmark with partners drawn from different business sectors or areas of activity to find ways of improving similar functions or work processes. This sort of benchmarking can lead to innovation and dramatic improvements.
6. **Internal Benchmarking:** It involves seeking partners from within the same organization, for example from business units located in different areas. The main advantages are (a) Easy access to sensitive data and information (b) Availability of standardized data; and (c) Lesser requirement of time and resources. However, real innovation may be lacking.
7. **External Benchmarking:** It involves seeking help of outside organization that are known to be best in class. It provides opportunities of learning from those who are at leading edge. However, this type of benchmarking may take up more time and resource to ensure the comparability of data and information. The credibility of the findings and the development of sound recommendation.
 - a. **Intra-Group Benchmarking:** Here the groups of companies in the same industry agree that similar units within the cooperating companies will pool data on their process. The processes are benchmarked against each other at or near operation level. 'Improvement Task forces' are established to identify and transfer best practice to all members of the group.
 - b. **Inter-industry benchmarking:** In inter-industry benchmarking a non-competing business with similar process is identified and asked to participate in a benchmarking exercise. For example, a publisher of schoolbook may approach a publisher of university level books to establish benchmarking relationship.

Stages in the process of Benchmarking

Stage 1: Planning

- (a) **Determination of benchmarking goal statement:** This requires identification of areas to be benchmarked, which uses the following criteria:

| Benchmark for Customer Satisfaction | Benchmark for improving Bottom line |
|---|-------------------------------------|
| ❖ Consistency of product or service | ❖ Waste and reject levels |
| ❖ Process cycle time | ❖ Inventory levels |
| ❖ Delivery performance | ❖ Work-in-Progress |
| ❖ Responsiveness to customer requirements | ❖ Cost of sales |
| ❖ Adaptability to special needs | ❖ Sales per employee |

- (b) **Identification of best performance:** The next step is seeking the best. To arrive at the best is both expensive and time consuming, so it is better to identify a company, which has recorded performance success in a similar area.
- (c) **Establishment of the benchmarking or process improvement team:** This should include persons who are most knowledgeable about the internal operations and will be directly affected by changes due to benchmarking.
- (d) **Defining the relevant benchmarking measures:** Relevant measures will not include the measures used by the organization today but they will be refined into measures that comprehend the true performance differences. Developing good measurement is key to successful benchmarking.

Stage 2: Collection of data and information:

This involves the following steps

- Compile information and data on performance. They may include mapping processes.
- Select and contact partners
- Develop a mutual understanding about the procedures to be followed and, if necessary, Benchmarking Protocol with partners.
- Prepare questions
- Distribute schedule of questions to each partner
- Undertake information and data collection by chosen method for example, interview, site- visits, telephone, fax and e-mail.
- Collect the findings to enable analysis.

Stage 3: Analysis of findings:

- Review the findings and produce tables, charts and graphs to support the analysis
- Identify gaps in performance between our organization and better performers.
- Seek explanations for the gaps in performance. The performance gaps can be positive negative or zero.
- Ensure that comparisons are meaningful and credible. Communicate the findings to those who are affected.
- Identify realistic opportunities for improvements. The negative performance gap indicates an undesirable competitive position and provides a basis for performance improvement. If there is no gap it may indicate a natural position relative to the performance being benchmarked. The zero position should be analysed for identifying means to transform its performance to a level of superiority

or positive gap.

Stage 4: Recommendations:

I. Making recommendations:

- (a) Deciding the feasibility of making the improvements in the light of the conditions that apply within own organization.
- (b) Agreement on the improvements that are likely to be feasible
- (c) Producing a report on the Benchmarking in which the recommendations are included.
- (d) Obtaining the support of key stakeholder groups for making the changes needed. Developing action plans for implementation.

II. Implementing recommendations:

- (a) Implement the action plans
- (b) Monitor performance
- (c) Reward and communicate successes
- (d) Keep key stakeholders informed of progress.

Stage 5: Monitoring and reviewing: This involves:

- (a) Evaluating the benchmarking process undertaken and the results of the improvement against objectives and success criteria plus overall efficiency and effectiveness.
- (b) Documenting the lessons learnt and make them available to others
- (c) Periodically re-considering the benchmarks for continuous improvement.

Pre-requisites for successful benchmarking

1. **Commitment:** Senior managers should support benchmarking and must be committed to continuous improvements.
2. **Clarity of Objectives:** The objectives should be clearly defined at the preliminary stage. Benchmarking teams have a clear picture of their organization's performance before approaching others for comparisons.
3. **Appropriate Scope:** The scope of the work should be appropriate in the light of the objectives resources, time available and the experience level of those involved.
4. **Resources:** Sufficient resources must be available to complete projects within the required time scale.
5. **Skills:** Benchmarking teams should have the right skills and competencies.
6. **Communication:** Stakeholder, particularly staff and their representatives are to be kept informed of the reasons for benchmarking.

Difficulties in implementation of Benchmarking

1. **Time consuming:** Benchmarking is time consuming and at times difficult. It has significant requirement of staff time and company resources. Companies often waste time in benchmarking non-critical functions.
2. **Lack of Management Support:** Benchmarking implementation require the direct involvement of the senior manager etc. The drive to be best in the industry or world cannot be delegated.
3. **Resistance from employees:** It is likely that there may be resistance from employees.

4. **Paper Goals:** Companies can become pre occupied with the measure. The goal becomes not to improve process but to match the best practices at any cost.
5. **Copy-paste attitude:** The key element in benchmarking is the adaptation of a best practice to tailor it to a company's needs and culture. Without that step, a company merely adopts another company's process. This approach condemns benchmarking to fail.

Benchmarking Code of Conduct

To contribute to efficient, effective, and ethical benchmarking, individuals agree for themselves and their organization to abide by the following principles for benchmarking with other organizations.

1. **Principle of Legality:** Avoid discussion or actions that might lead to or imply an interest in restraint of trade; market or customer allocation schemes, price fixing dealing arrangements bid rigging, bribery or misappropriation. Do not discuss costs with competitors if costs are an element of pricing.
2. **Principles of Exchange:** Be willing to provide the same level of information that you request in any benchmarking exchange.
3. **Principle of Confidentiality:** Treat benchmarking interchange as something confidential to the individuals and organizations involved. Information obtained must not be communicated outside the partnering organization without prior consent of participating benchmarking partners. An organization's participation in a study should not be communicated externally without their permission.
4. **Principle of Use:** Use information obtained through benchmarking partnering only for the purpose of improvement of operations with the partnering companies themselves. External use or communications of a benchmarking partner's name with their data of observed practices requires permission of that partner. Do not, as a consultant of client, extend one company's benchmarking study findings to another without the first company's permission.
5. **Principle of First Party Contact:** Initiate contacts, whenever possible, through a benchmarking contact designated by the partner company. Obtain mutual agreement with the contact on any hand off of communication or responsibility to other parties.
6. **Principle of Third Party Contact:** Obtain an individual's permission before providing their name in response to a contact request.
7. **Principle of Preparation:** Demonstrate commitment to the efficiency and effectiveness benchmarking process with adequate preparation at each process particularly, at initial partnering contact.

Variance Analysis: Distinct groups of variances that arise in standard costing

The three distinct groups of variances that arise in standard costing are:

- (i) **Variances of efficiency:** These are the variance, which arise due to efficiency or inefficiency in use of material, labour etc.
- (ii) **Variances of prices and rates:** These are the variances, which arise due to changes in procurement price and standard price.
- (iii) **Variances due to volume:** These represent the effect of difference between actual activity and standard level of activity. These can be summarized as under:

| Element of cost | Variance of Efficiency | Variance of price | Variance of volume |
|-----------------|------------------------|-------------------|----------------------------------|
| Material | Usage, Mixture, Yield | Price | Revision |
| Labour | Efficiency, idle time | Rate of pay | -- |
| Variable OH | Efficiency | Expenditure | Revision |
| Fixed OH | Efficiency | Expenditure | Revision Capacity Calendar |

Calculation of variances in standard costing is not an end in itself, but a means to an end

The crux of standard costing lies in variance analysis. Standard costing is the technique whereby standard costs are predetermined and subsequently compared with the recorded actual costs. It is a technique of cost ascertainment and cost control. It establishes predetermined estimates of the cost of products and services based on management's standards of efficient operation. It thus lays emphasis on "what the cost should be". These should be costs are when compared with the actual costs. The difference between standard cost and actual cost of actual output is defined as the variance.

The variance in other words is the difference between the actual performance and the standard performance. The calculations of variances are simple. A variance may be favourable or unfavorable. If the actual cost is less than the standard cost, the variance is favourable but if the actual cost is more than the standard cost, the variance will be unfavorable. They are easily expressible and do not provide detailed analysis to enable management of exercise control over them. It is not enough to know the figures of these variances from month to month. We in fact are required to trace their origin and causes of occurrence for taking necessary remedial steps to reduce / eliminate them.

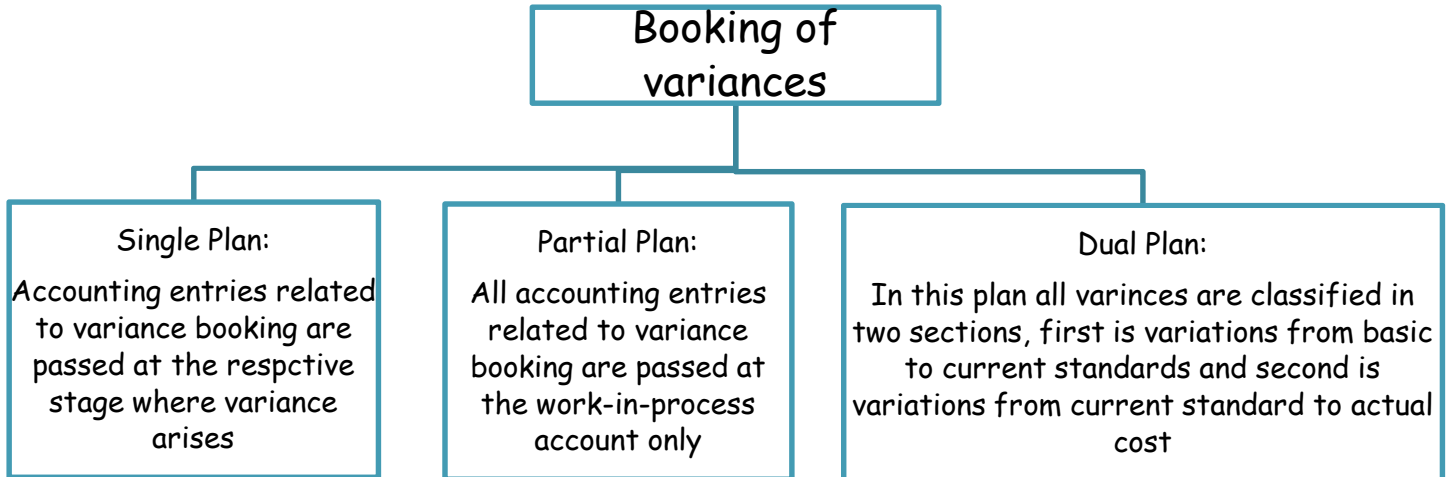
A detailed probe into the variance particularly the controllable variances help the management to ascertain:

- (i) The amount of variance
- (ii) The factors or causes of their occurrence
- (iii) The responsibility to be laid on executives and departments and
- (iv) Corrective actions which should be taken to obviate or reduce the variances.

Mere calculation and analysis of variances is of no use. The success of variance analysis depends upon how quickly and effectively the corrective actions can be taken on the analysed variances. In fact variance gives information. The manager needs to act on the information provided for taking corrective

action. Information is the means and action taken on it is the end. In other words, the calculation of variances in standard costing is not an end in itself, but a means to an end.

BOOKING & DISPOSITION OF VARIANCES:



Single Plan: In the single plan, variances are analysed at the point of their occurrence. The single plan system envisages the posting of all items in the debit side of the work-in-progress account at the standard cost leaving the credit side to represent the standard cost of finished production and work-in-progress. This system enables the ascertainment of variances as and when the transaction is posted to work-in-progress account. Since, the single plan system contemplates the analysis of variances at source, the installation of this system requires more planning so that effective documentation at each stage is introduced for proper recording and analysis of variance.

Scheme of entries: So far as materials are concerned, material price variances are recorded at the time of receipt of the material and the material quantity variances are recorded as far as possible when excess materials are used. The entries will be as illustrated below.

1. Dr. Material Control A/c
 Dr. or Cr. Material Price Variance A/c
 Cr. General Ledger Adjustment A/c.

This entry enables the firm to debit the material control account with the actual purchases at standard cost and credit the creditor's account at the actual cost of actual prices thereby transferring the variances to price variance account.

2. Dr. Work-in-progress Control A/c
 Dr. or Cr. Material Usage Variances A/c
 Cr. Material Control A/c

This entry charges the work-in-progress control account with the standard cost of standard quantity and

credit the material control account at the standard cost of actual issue, the variance being transferred to usage variance account.

3. Dr. Work-in-progress Control A/c
Dr. or Cr. Labour Efficiency Variances A/c
Cr. Wages Control A/c
4. Dr. Wages Control A/c
Dr. /Cr. Labour Rate Variances A/c
Cr. General Ledger Adjustment A/c

These entries are passed to record the wages at standard rate thereby transferring rate and efficiency variances to the appropriate account.

5. Dr. Work-in-progress Control A/c
Dr. or Cr. Overhead Volume Variances A/c
Cr. Overhead Expense Control A/c
6. Dr. Overhead Expense Control A/c
Dr. or Cr. Overhead Expense Variances A/c
Cr. General Ledger Adjustment A/c.

These entries are passed to record the wages at standard rate thereby transferring rate and efficiency variances to the appropriate account.

Partial plan: Under this system the analysis of the variance is done after the end of the month. In this method the work-in-progress account is charged at the actual cost of production for the month and is credited with the standard cost of the month's production of finished product. The closing balance of work-in-progress is also shown at standard cost. The balance after making the credit entries represent the variance from standard for the month. This method is simple in operation because variances are analysed after the end of month. Scheme of entries in this method is as follows:

1. Material Control A/c Dr.
To General Ledger Adjustment A/c

(With the actual purchase value of materials)

2. Work-in-Progress A/c Dr.
To Material Control A/c

(Being the cost of materials actually issued to production at the actual rate)

3. Work-in-Progress A/c Dr.
To Wages Control A/c

(Being the actual amount of direct wages paid)

4. Work-in-Progress A/c Dr.
 To Overhead Expense Control A/c

(Being the actual overhead expenses incurred)

5. Finished Stock Control A/c Dr.
 To Work-in-Progress A/c

(Being the standard cost of production transferred to finished goods account)

6. Cost of Sales A/c Dr.
 To Finished Stock Control A/c

(Being the standard cost of goods sold transferred to Cost of Sales A/c)

7. Material price variance A/c Dr.
 Material usage variance A/c Dr.
 Labour rate variance A/c Dr.
 Labour efficiency variance A/c Dr.
 Overhead efficiency variance A/c Dr.
 Overhead capacity variance A/c Dr.
 Overhead expense variance A/c Dr.
 To work-in-progress A/c

(Being the all adverse variances identified and separated from cost for favourable variances this entry may be reversed)

Dual Plan: Dual Plan is a method of recognition of variances by use of Basic and Current Standards. (Under Single Plan and Partial Plan, only Current Standards are used). Under Dual Plan, variances are not computed by amounts of cost. Instead, the variances are expressed in the form of efficiency indices, using ratio analysis.

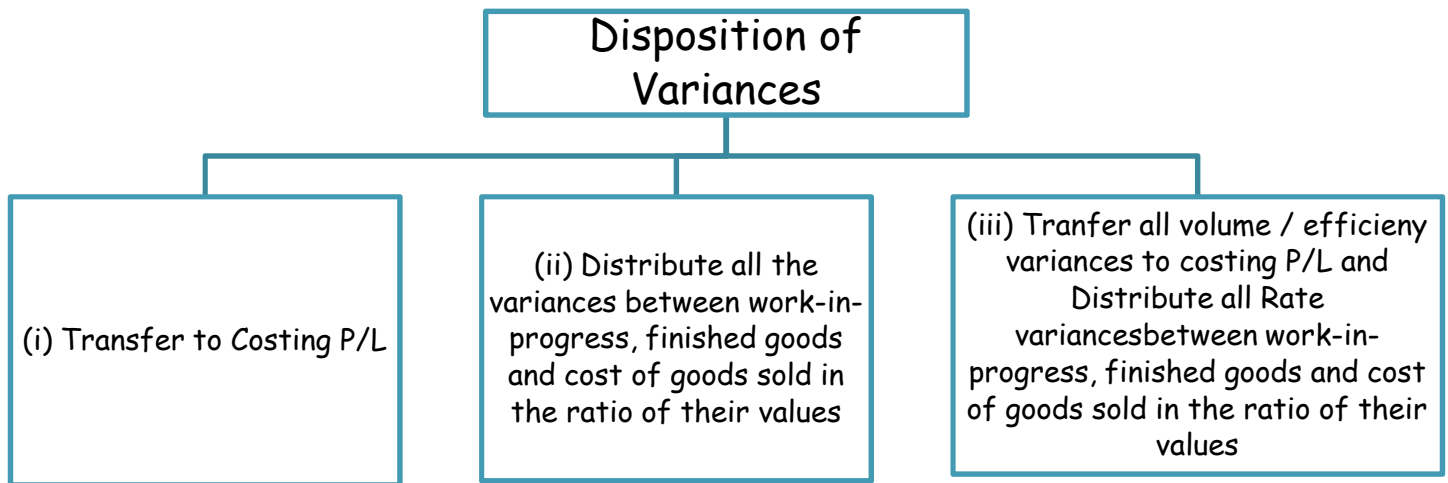
The procedure for Variance Reporting is as under —

Step 1: Express the Actual Cost as a percentage of Basic Cost.

Step 2: Express the Current Cost as a percentage of Basic Cost.

Step 3: Compare the two percentages to find out the extent of deviation from Current Standards.

Step 4: Compare the above percentages with those of the previous periods to establish the trend of actual and current standard from Basic Cost.



Difference between Standard Costing and Budgetary Control

| Particulars | Standard Costing | Budgetary Control |
|--------------------------------|---|---|
| Meaning | Standards costs are pre-determined costs representing what the costs should be, at the level of efficient conditions of production and operation. | Budgets are financial and/or quantitative statements, prepared and approved prior to a defined period of time, of the policy to be pursued during that period for achieving that objective. |
| Coverage | They are generally restricted to costs. | They include estimates of income, costs and employment of capital. |
| Basis | These are determined by the collection of technical data related to production and applying costs to each element of production. | These are determined based on management's plans of what should be done to achieve a certain objective and how to actually achieve it. |
| Effect of temporary conditions | If, in a particular year, the costs are likely to be high due to certain factors, standard costs are not changed unless the factors are permanent in nature. Effect of short-run temporary changes will not be reflected in Standard Costs. | Budgeted costs are estimated keeping in view actual conditions and attainable targets of a period under review, in view of the conditions that are likely to be prevalent in that year. The effect of short-term changes in cost structure, etc, will be fully reflected in budgeted costs. |
| Permanence | Standard costs are usually semi-permanent in nature and may not be changed unless and until there are changes in the basic price structure or in the methods of operations. | They are estimated usually for one year and take into account the practical problems of operations and are kept at a level, which the Firm hopes to achieve in the year for which the budget is being prepared. |

4: PROCESS CONTROL AND ACTIVITY BASED COST MANAGEMENT

ACTIVITY BASED COSTING (ABC)

State the need, purpose and benefits of ABC.

Need for ABC:

Traditional product costing systems were designed when company's manufactured narrow range of products. Direct material and direct labour were dominant factors of production and Overheads were relatively small and distortions due to inappropriate treatment were not significant. Cost of processing information was high. Today companies produce a wide range of products. Overheads are significant in value. Simple methods of apportioning overheads on direct labour or machine hours basis is not justified. Non volume related activities like material handling, set up etc. are important and their costs cannot be apportioned on volume basis.

Manufacturing organizations need ABC for product costing where:

1. Production overheads are high in relation to direct costs.
2. There is great diversity in the product range.
3. Products use very different amounts of the overhead resource.
4. Consumption of overhead resources is not primarily driven by volume.

Purposes and benefits of ABC

1. To link the cost to its causal factor – i.e. the Cost Driver
2. To identify costs of activities rather than cost centres
3. To ascertain product costs with greater accuracy by relating overheads to activities
4. To overcome the inherent limitations of traditional absorption costing and use of blanket overhead rates.

Steps involved in the installation of an Activity Based Costing System

1. **Specification of Objectives:** The motives for pursuing an ABC system must be established at the outset, Generally, the objectives are:
 - (a) To improve product costing where a belief exists that existing methods undercost some products and overcost others; or
 - (b) To identify non-value adding activities in the production process which might be a suitable focus for attention or elimination.
2. **Identification of Costs for ABC:** Direct costs, like materials and direct labour, are easily assigned

directly to products. Some indirect costs that are product specific (e.g. specific advertising, dealer's commission) may be directly assigned to the product. Hence, the remaining indirect costs form the focus of ABC. Such costs are indirectly assigned to the cost object (i.e. product) via Cost Pools and Activity Drivers.

3. **Process Specification:** This involves identification of different stages of the production process, the commitment of resources to each processing times and bottlenecks. This will provide a list of transactions which may or may not be defined as 'activities' at a subsequent stage.
4. **Activity definition:** The list of transactions as identified in the previous stage is analysed. This ensures aggregation or grouping of common activities and elimination of immaterial activities. Activities are categorized into Primary Activities and Support Activities. The resultant costs pools will likely-have-a number of different events or drives, associated with their incurrence.
5. **Activity driver selection:** Activity cost drivers used to relate the overheads collected in the cost pools to cost objects (products) should be determined. This is based on the factor that drives the consumption of the activity, i.e. the answer to the question; What causes the activity to incur costs? Generally a single Driver is selected for every activity even though multiple and inter related activity drivers exist.
6. **Costing:** A single representative activity driver can be used to assign costs from the activity pools to the cost objects. Such linking of total Costs to Cost objects is generally based on the activity cost driver rate.
7. **Staff Training:** The co-operation of the work force is critical to the successful implementation of ABC. Staff training should be oriented to create an awareness of the purpose of ABC. The need for staff co-operation in the concerted team effort for mutual benefit must be emphasized throughout the training activity.
8. **Review and Follow-up:** The actual operation of the ABC system should be closely monitored. Periodic Review and Follow-up action is necessary for successful implementation of the system.

Difference between Traditional Absorption Costing and ABC

| Traditional Absorption Costing | Activity Based Costing |
|--|--|
| Overheads are first related to departments cost centres (Production and Service Cost Centres) | Overheads are first related to activities or grouped into Cost Pools. |
| Only two types of activities viz. Unit Level Activities and Facility Level Activities are identified. | All levels of activities in the manufacturing cost hierarchy viz. Unit Level, Batch Level, Product Level and Facility Level are identified. |
| This method relates overheads to cost centres i.e. locations. It is not realistic of the behaviour of costs. | This method relates overheads to the causal factor i.e. driver. Thus, it is more realistic of cost behaviour. |
| Overhead Rates can be used to ascertain cost of products only. | Activity Cost Driver Rates can be used to ascertain cost of products and also cost of other cost objects such as customer segments, distribution channels etc. |

Identification of activities for ABC

Meaning of Activities: Activities comprise of units of work or tasks. For example, purchase of materials is an activity consisting a series of tasks like purchase requisition, advertisement inviting quotations, identification of suppliers, placement of purchase order, follow-up etc.

Types of Activities: Activities basically fall into four different categories, known as the manufacturing cost hierarchy. The categories are:

| Type of Activity | Examples |
|--|---|
| Unit level activities: These are activities for which the consumption of resources can be identified with the number of units produced. The costs of some activities (mainly primary activities) are strongly correlated to the number of units produced. | <ul style="list-style-type: none"> ❖ Use of indirect materials / consumables. ❖ Inspection or Testing |
| Batch level activities: The costs of some activities (mainly manufacturing support activities) are driven by the number of batches of units produced. These are activities related to setting up of a batch or a production run. The costs of such activities vary with the number of batches made, but is fixed for all units within that batch. | <ul style="list-style-type: none"> ❖ Material ordering-where an order is placed for every batch of production. ❖ Machine set-up costs-where machines need resetting between each different batch of production. ❖ Inspection of Products-where the first item in every batch is inspected. |
| Product level activities: The costs of some activities (often once only activities) are driven by the creation of a new product line and its maintenance. These are activities performed to support different products in the product line. | <ul style="list-style-type: none"> ❖ Designing the product. ❖ Producing parts specifications and keeping technical drawings of products up-to-date. ❖ Advertising of individual products rather than company's name. |
| Facility Level Activities: These are activities necessary for sustaining the manufacturing process and cannot be directly attributed to individual products. | <ul style="list-style-type: none"> ❖ Ground Maintenance ❖ Plant Security ❖ Production Manager's Salary |

Choice of Activities for ABC: While the number of departments or cost centres can be smaller activities can be numerous. Hence, all activities are not considered for ABC purposes. The final choice of activities depends on the following factors:

- (a) Cost of that activity should be significant / material enough to justify separate treatment.
- (b) The activity should be driven / influenced by a single cost driver. For example, material procurement cost may be driven by the number of purchase orders. However, receiving and issuing materials is not driven by the same driver and should be separately identified.

Activity Based Cost Management (ABM)

The use of ABC as a costing tool to manage costs at activity level is known as Activity Based Cost

Management (ABM). Through various analyses, ABM manages activities rather than resources. It determines what drives the activities of the organization and how these activities can be improved to increase the profitability. ABM utilizes cost information gathered through ABC.

ABM is a discipline that focuses on the management of activities as the route to improving the value received by the customer and the profit achieved by providing this value. This discipline includes (a) Cost Driver analysis; (b) Activity analysis; and (c) Performance analysis.

Cost Driver Analysis:

Cost Driver analysis identifies the factors that cause activities to be performed in order to manage activity costs. An activity may be performed inefficiently due to a particular reason. Managers have to address this cost driver to correct the root cause of the problem.

Activity Analysis (Value Analysis): (November 2009)

It involves identification of the activities of an organization and the activity centres (or activity cost pools that should be used in an ABC system). Activity analysis also identifies Value Added (VA) and Non Value Added (NVA) activities, so that all Non Value Added Activities can be eliminated from the process in order to control costs.

Value Added and Non-value Added activities

| Value-added activities (VA) | Non-value-added activities (NVA) |
|---|---|
| These are activities necessary for the performance of the process. | These are additional and extraneous activities, not fully necessary for the performance of the process. |
| These represent work that is valued by the external or internal customer. | These represent work that is not valued by the external or internal customer. |
| They improve the quality or function of a product. Hence, the customers are usually willing to pay for the service. VA activities result in "Cost" and not in losses. | NVA activities do not improve the quality or function of a product or service but they can adversely affect costs and prices. NVA activities create waste, result in delay of some sort, add cost to the products or services for which the customer is not willing to pay. |
| Example: Making product more versatile for certain other uses. | Examples: Moving materials and machine set up for a production run. |

Performance Analysis:

Performance analysis involves the identification of appropriate measures to report the performance of activity centres or other organizational units, consistent with each unit's goals and objectives. Performance analysis aims to identify the best ways to measure the performance of factors that are important to organizations in order to stimulate continuous improvement.

QUESTION:

State whether each of the following independent activities, is value added or non value added.

- (i) Polishing of furniture used by a system engineer in a software firm.
- (ii) Maintenance by a software company of receivables management software for a banking company.
- (iii) Printing of pencils manufactured by a pencil activity.
- (iv) Cleaning of customers' computer boards by a computer repair centre.
- (v) Providing break adjustments in cars received for service by a car service station,

Benefits of ABM

1. **Cost Reduction:** Provision of excellent basis and focus for cost reduction.
2. **Budget implementation:** Provides operational management with a clear view of “how to implement an Activity Based budget.”
3. **Cost Definition:** Provision of clear understanding of the underlying causes of business processing costs.
4. **Decision Making:** Provision of excellent basis for effectiveness of management decision-making.
5. **Resource utilization:** Identification of key process waste elements permits management prioritization and leverage of key resource.

Difference between ABC and ABM

| ABC | ABM |
|--|---|
| ABC refers to the technique of determining the costs of activities and the cost of output that those activities produce. | It refers to the management philosophy that focuses on the planning, execution and measurement of activities as the key to competitive advantage. |
| The aim of ABC is to generate improved cost data for use in managing a company's activities. | The ABM is a much broader concept. Its aim is to use information generated by ABC, for effective business processes and profitability. |

5: TOTAL QUALITY MANAGEMENT

TQM (Meaning and core concepts)

Definition:

TQM is defined as a set of concepts and tools for getting all employees focused on continuous improvement in the eyes of the customer.

- The TQM approach highlights the need for a customer-oriented approach to management reporting, eliminating some or more of traditional reporting practices.
- TQM seeks to increase customer satisfaction by finding the factors that limit current performance.
- The emphasis of TQM is to design and build quality in the product, rather than allow defectives and then inspect and rectify them. The focus is on the causes rather than the symptoms of poor quality.

Three core concepts of TQM:

- *Quality Control (QC)*: It is concerned with the past, and deals with data obtained from previous production, which allow action to be taken to stop the production of defective units.
- *Quality Assurance (QA)*: It deals with the present, and concerns the putting in place of system to prevent defects from occurring.
- *Quality Management (QM)*: It is concerned with the future, and manages people in the process of continuous improvement to the products and services offered by the organisation.

Steps to be taken in the implementation of TQM

Various stages / steps to be taken in the implementation of TQM:

Stage 1: Identification of customers / customer groups: Through a team approach (a technique called Multi-voting), the firm should identify major customer groups. This helps to priorities the list of customers and provides a focus of services.

Stage 2: Identifying customer expectations: Once the major customer groups are identified, their expectations are listed. The question to be answered is – what does the customer expect from the firm?

Stage 3: Identifying customer decision-making requirements and product utilities: Where the focus is on quality improvement, the overriding need is to stay close to the customers and follow their suggestions. In this way, a decision-support system can be developed, incorporating both financial and non-financial information, which seeks to satisfy user requirements. Hence, the firm finds out the answer to – what are customer's decision – making requirements and product utilities? The answer is sought by listing out managerial perceptions and not by actual interaction with the customers.

Stage 4: Identifying perceived problems in decision-making process and product utilities: Using participative processes such as brainstorming and multi-voting, the firm seeks to list out its perception of problem areas and shortcomings in meeting customer requirements. This will list out areas of weakness

where the greatest impact could be achieved through the implementation of improvements. The firm identifies the answer to the question – what problem areas do we perceive in the decision-making process?

Stage 5: Comparison with other organizations and bench marking: Detailed and systematic internal deliberations allow the firm to develop a clear idea of their own strengths and weaknesses and of the areas of most significant deficiency. The benchmarking exercise allows the firm to see how other companies are coping with similar problems and opportunities.

Stage 6: Customer feedback: Stages 1 to 5 provide information base, developed without reference to the customer. This is rectified at stage 6 with a survey of representative customers, which embraces their views on perceived problem areas. Interaction with the customers and obtaining their views, helps the firm in correcting its own perceptions and refining its processes.

Stage 7 & 8: The identification of improvement opportunities and Quality Improvement Process: The outcomes of the customer survey, benchmarking and internal analysis provides the inputs for stages 7 and 8, i.e. the identification of improvement opportunities and the implementation of a formal improvement process. This is done through a six-step process called PRAISE, for short.

PRAISE Analysis, Difficulties in PRAISE Analysis and remedial action.

The identification of improvement opportunities and implementation of quality improvement process (Stages 7 and 8) of the TQM Process is through a six-step activity sequence, identified by the acronym 'PRAISE'. Following are the steps involved in PRAISE Analysis:

| Step | Activity | Elements |
|------|------------------------|---|
| 1 | Problem Identification | <ul style="list-style-type: none"> ❖ Areas of customer dissatisfaction ❖ Absence of competitive advantage ❖ Complacency regarding present arrangements |
| 2 | Ranking | Priorities problems and opportunities by <ul style="list-style-type: none"> ❖ Perceived importance, and ❖ Ease of measurement and solution |
| 3 | Analysis | <ul style="list-style-type: none"> ❖ Ask "Why?" to identify possible causes. Keep asking "Why?" to move beyond the symptoms and to avoid jumping to premature conclusions. ❖ Ask "What?" To consider potential implications ❖ Ask "How much?" to quantify cause and effect |
| 4 | Innovation | <ul style="list-style-type: none"> ❖ Use creative thinking to generate potential solution ❖ Operationalise these solutions by identifying barriers to implementation, Available enablers, and People whose co-operation must be sought. |
| 5 | Solution | <ul style="list-style-type: none"> ❖ Implement the preferred solution ❖ Take appropriate action to bring about the required changes ❖ Reinforce with training and documentation back-up |
| 6 | Evaluation | <ul style="list-style-type: none"> ❖ Monitor the effectiveness of actions established. ❖ Interpret performance indicators to track progress towards objectives. ❖ Identify the potential for further improvements and return to step 1 |

Difficulties experienced at each step in the PRAISE process:

| Step | Activity | Difficulties | Remedies |
|------|------------------------|---|---|
| 1 | Problem Identification | <ul style="list-style-type: none"> ❖ Effects of a problem are apparent but problem themselves are difficult to identify. ❖ Problem may be identifiable, but it is difficult to identify a measurable improvement opportunity ❖ Some problems are too vague to define e.g. morale, communication, productivity etc. | <ul style="list-style-type: none"> ❖ Participative approaches like brainstorming, multi-voting, panel discussion ❖ Quantification and precise definition of problem |
| 2 | Ranking | <ul style="list-style-type: none"> ❖ Difference in perception of individuals in ranking ❖ Difference in preferences based on functions e.g. production, finance, marketing etc. ❖ Lack of consensus between individuals | <ul style="list-style-type: none"> ❖ Participative approach ❖ Subordination of individual to group interest |
| 3 | Analysis | <ul style="list-style-type: none"> ❖ Adoption of ad hoc approaches and quick-fix Solutions | <ul style="list-style-type: none"> ❖ Lateral Thinking ❖ Brainstorming |
| 4 | Innovation | <ul style="list-style-type: none"> ❖ Lack of creativity or expertise ❖ Inability to operationalise ideas, i.e. convert thoughts into action points. | <ul style="list-style-type: none"> ❖ Systematic evaluation of all aspects of each strategy |
| 5 | Solution | <ul style="list-style-type: none"> ❖ Resistance from middle mangers | <ul style="list-style-type: none"> ❖ Effective internal communication ❖ Training of personnel and managers ❖ Participative approach |
| 6 | Evaluation | <ul style="list-style-type: none"> ❖ Problems in implementation ❖ Lack of measurable data for comparison of expectations with actual | <ul style="list-style-type: none"> ❖ Effective control ❖ System to track actual ❖ Feedback system |

Central to the PRAISE system are (a) quality control – the search for continuous improvements in quality – and (b) total employee involvement – the co-operation and commitment of employees. This dual approach provides a single focus – the customer – whose increased satisfaction remains the primary goal of the procedure.

What are the six C's for successful implementation of TQM?

Fundamental requirements for the implementation of the TQM process:

1. **Commitment:** If a TQM culture is to be developed, total commitment must come from top management. It is not sufficient to delegate 'quality' issues to a single person. Quality expectations must be made clear by the top management, together with the support and training required for its achievement.
2. **Culture:** Training lies at the centre of effecting a change in culture and attitudes. Negative perceptions must be changed to encourage individual contributions and to make 'quality' a normal part of everyone's job.
3. **Continuous improvement:** TQM should be recognised as a 'continuous process'. It is not a 'one-time-program'. There will always be room for improvement, however small.

4. **Co-operation:** TQM visualizes Total Employee Involvement (TEI). Employee involvement and cooperation should be sought in the development of improvement strategies and associated performance measures.
5. **Customer Focus:** The needs of external customers (in receipt of the final product or service) and also the internal customers (colleagues who receive and supply goods, services or information), should be the prime.
6. **Control:** Documentation procedures and awareness of current best practice are essential if TQM implementations are to function appropriately. Unless control procedures are in place, improvements cannot be monitored and measured nor deficiencies corrected.

Fundamental principles associated with four P's of quality improvement

The problems listed for the PRAISE process, may lead to 4 P's of TQM process. It is possible that the organisation is led to Total Quality Paralysis instead of improvement. To avoid such disruption and paralysis the following principles (called the four P's) of TQM should be followed:

- (a) **People:** Some individuals are not ideally suited to the participatory process of TQM. This will be inferred from lack of enthusiasm, non-attendance at TQM meetings, failure to complete delegated work, remaining a "Mute Spectator" at TQM meetings etc. To avoid misdirection, TQM teams should consist of team spirited individuals who have a flair for accepting and meeting challenges.
- (b) **Process:** It is essential to approach problem-solving practically and to regard the formal process as a system designed to prevent participants from jumping to conclusions. As such it will provide a means to facilitate the generation of alternatives while ensuring that important discussion stages are not omitted.
- (c) **Problem:** Problems need to be approached in bite-sized chunks, with teams tackling solvable problems with a direct economic impact, allowing for immediate feedback together with recognition of contribution made by individual participants.
- (d) **Preparation:** Additional courses on creative thinking and statistical processes are needed in order to give participants a greater appreciation of the diversity of the process. This training must quickly be extended beyond the immediate accounting circle to include employees at supervisory levels and also who are involved at the data input stage.

Three-point action plan for Smooth implementation of PRAISE process

A three-point action plan for implementation of the process is:

1. **Bite-sized chunks:** Big improvement opportunities are generally complex and require extensive inter departmental co-operation. The choice of a relatively small problem in the first instance provides a greater chance of success. Therefore, the TQM team has to proceed from small to big issues gradually.
2. **Solvable problem:** The problem selected should not be trivial, but it should be one with a potential impact and a clear improvement opportunity. Measurable progress towards implementation should be accomplished within a reasonable time in order to maintain the motivations of participants and advertise the success of the improvement itself.

3. **Recognition of participants:** The successful projects and team members should receive appropriate recognition throughout the enterprise. Prominent individuals should be rewarded for their efforts as a measure of personal recognition and as encouragement to others. The reward may be recognition itself, and sometimes monetary / non-monetary prizes may also be given.

Components of cost to be reported in a Cost of Quality Report

1. **Prevention Costs:** These are incurred in preventing the production of products that do not conform to specification. Some examples of these costs are: (i) Quality engineering, (ii) Quality training, (iii) Quality audit, (iv) Design Review, (v) Quality circles etc.
2. **Appraisal Costs:** These are incurred to ensure that materials and product meet quality performance standards. Some examples of these costs are: (i) Inspection, (ii) Product acceptance, (iii) Packaging inspection, (iv) Field Testing, (v) Continuing supplier verification etc.
3. **Internal Failure Costs:** These are associated materials and products that fail to meet quality standards. They include costs incurred before the product is dispatched to the customer, such as the costs of (i) Scrap, (ii) Repair, (iii) Rework, (iv) Re-inspection and (iv) Downtime and work stoppages caused by defects etc.
4. **External failure Costs:** These are incurred when inferior products are delivered to customers. They include the cost of (i) Handling customer complaints, (ii) Warranty replacement, (iii) Repairs of returned products, (iv) Discount due to defects and (v) The costs arising from a damaged company reputation etc.

Note: Prevention and appraisal costs are called Costs of Quality Compliance while Internal and external failure costs are called Costs of Non-compliance.

QUESTION:

Classify the following items under appropriate categories of quality costs viz. Prevention costs, Appraisal cost, Internal failure costs, External failure costs:

- (i) Rework
- (ii) Disposal of scrap
- (iii) Warranty repairs
- (iv) Revenue loss
- (v) Repairs to manufacturing equipments
- (vi) Discount on defective sale
- (vii) Raw material inspection
- (viii) Finished product inspection
- (ix) Establishment of quality circles
- (x) Packaging inspection.

Critical success factors for the implementation of a programme of TQM

Critical success factors of TQM:

1. The focus should be on customer needs.
2. Everyone within the organization should be involved in TQM The focus should be on continuous improvement.
3. The aim should be to design and produce quality products.
4. Introduce an effective performance measurement system that ensures continuous improvements from the customer's perspective.
5. Existing rewards and performance measurements should be renewed to encourage quality improvements.
6. Appropriate training and education should be given so that everyone is aware of the aims of TQM.

6: OPERATIONS RESEARCH

ASSIGNMENT PROBLEM: ALTERNATIVE SOLUTION

Sometimes while assigning jobs from the final matrix we may not find any row or column with single "0". In these cases we can choose any one "0" for the purpose of assignment, but sometimes in these situations there may be clashes of "0". This type of situation is called multiple optimal solution case, and in these situations, there exist more than one optimal solution having equal answer, though internal assignments may change.

TRANSPORTATION PROBLEM: Initial solution obtained by Vogel's Approximation Method and the Least Cost Method be the same?

The initial solution need not be the same under both methods.

Vogel's Approximation Method uses the differences between the minimum and the next minimum costs for each row and column. This is the penalty or opportunity cost of not utilising the next best alternative. The highest penalty is given the 1st preference. This need not be the lowest cost. For example if a row has minimum cost as 3, and the next minimum as 2, penalty is 1; whereas if another row has minimum 4 and next minimum 6, penalty is 2, and this row is given preference. But least cost given preference to the lowest cost cell, irrespective of the next cost. Vogel's Approximation Method will result in a more optimal solution than least cost. They will be the same only when the maximum penalty and the minimum cost coincide

DEGENERACY IN A TRANSPORTATION PROBLEM

If a basic feasible solution of transportation problem with m origins and n destinations has fewer than $m + n - 1$ allocations (occupied cells) the problem is said to be a degenerate transportation problem. Such a situation may be handled by introducing a significantly small allocation "e" in the least cost and independent cell. While in the simple computation degeneracy does not cause any serious difficulty, it can cause computational problem in transportation problem. If we apply modified distribution method, then the dual variable u_i and v_j are obtained from the C_{ij} value to locate one or more C_{ij} value which should be equated to corresponding $C_{ij} + V_{ij}$.

ALTERNATIVE SOLUTION FOR A TRANSPORTATION PROBLEM

Sometimes in final solution we may find one or more C_{ij} values equal to "0" this indicates the problem have more than one optimum solution having equal answers. No. of alternative solutions will always be equal to no. of "0" C_{ij} values in the final solution. Steps to arrive at alternative solution from the final solution:

- (i) Select any '0' C_{ij} value cell.
- (ii) Make a loop from this cell.
- (iii) Put +, - signs alternatively on the corners of loop, start with (+) "0" C_{ij} value corner of the loop.

- (iv) Select minimum value of transportations from the corners having '-ve' signs and add this value in the value of transportations having positive sign, and deduct it from the value of transportations having negative sign.
- (v) Resulting matrix will be the alternative solution.

APPLICATION OF LINEAR PROGRAMMING

Linear programming technique can be used in various fields where optimum utilization of limited resources is required. This technique is very much useful in working with different types of constraints. In practical life uses of this technique range from agriculture, business and industry to government with the most extensive applications being those in industry and commerce, problems involving blending of petroleum, animal feed blending, production planning and inventory control, problems determining optimal product mix, problems dealing with training and assignment of personnel, transport of commodities and allocation of funds are some of the areas of business applications of linear programming. All these areas can be explained with the help of following:

1. **In production:**
 - Production mix under capacity constraints to minimise costs/ maximise profits along with marginal costing.
 - Inventory management to minimise holding cost, warehousing/ transporting from factories to warehouses etc.
2. **Sensitivity Analysis:** By providing a range of feasible solutions to decide on discounts on selling price, decisions to make or buy.
3. **Blending:** Optional blending of raw materials under supply constraints.
4. **Finance:** Portfolio management, interest/ receivables management.
5. **Advertisement mix:** In advertising campaign – analogous to production management and production mix. Assignment of personnel to jobs and resource allocation problems. However, the validity will depend on the manager's ability to establish a proper linear relationship among variables considered.

LIMITATIONS OF LINEAR PROGRAMMING

Following are the limitations of linear programming problems:

1. A primary requirement of linear programming is that the objective function and every constraint function must be linear. This requires that the measure of effectiveness and resource usage must be proportional to the level of each activity conducted individually. However, programming problems which are non-linear arise quite frequently. It is occasionally possible to reformulate a non-linear programming problem into the linear programming format so that the simplex method can be used. This, however, is the fortunate exception rather than the rule.
2. It may not be possible to solve those problems using linear programming in which non-linearity arises because of joint interactions between some of the activities regarding the total measure of effectiveness or total usage of some resource. Hence, linear programming problem requires that the total measure of effectiveness and total resource usage resulting from the joint performance of the activities must equal the respective sums of these quantities resulting from each activity

being performed individually. In some situations, it may not be true. For example, consider a situation where a by-product is produced with the scrap material from two primary products. The material would still have to be produced if only one of the two products were produced. However, the total material requirements if both products are produced is less than the sum of requirements if each were produced individually. It may not be possible to handle such situations with linear programming problems.

3. In linear programming problem, fractional values are permitted for the decision variables. However, many decision problems require that the solution for decision variables should be obtained in non-fractional values. Rounding-off the values obtained by linear programming techniques may not result into an optimal solution in such cases.
4. In linear programming problems, coefficients in the objective function and the constraint equations must be completely known and they should not change during the period of study i.e. they should be known constraints. In practical situation, it may not be possible to state all coefficients in the objective function and constraints with certainty. Furthermore, these coefficients may actually be random variables, each with an underlying probability distribution for the values. Such problems cannot be solved using linear programming.

CHARACTERISTICS OF THE DUAL PROBLEM

For any linear programming model called primal model, there exists a companion model called the dual model. Following are the characteristics of the dual problem:

1. The number of constraints in the primal model equals the number of variables in the dual model.
2. The number of variables in the primal problem equals the number of constraints in the dual model.
3. If the primal model is a maximization problem then the dual model will be of the form less than or equal to, " \leq " while the restrictions in the dual problem will be of the form-greater than or equal to, " \geq ".
4. The solution of the primal model yields the solution of the dual model. Also, an optimal simplex table for the dual model yields the optimal solution to the primal model. Further, the objective functions of the two optimal tables will have identical values.
5. Dual of the primal's dual problem is the primal problem itself.
6. Feasible solutions to a primal and dual problem are both optimal if the complementary slackness conditions hold, that is, (value of a primal variable) \times (value of the corresponding dual surplus variable) = 0 or (value of a primal slack variable) \times (value of the corresponding dual variable) = 0.
7. If this relationship does not hold, then either the primal solution or the dual solution or both are not optimal.
8. If the primal problem has no optimal solution because of infeasibility, then the dual problem will have no optimal solution because of unboundedness.
9. If the primal has no optimal solution because of unboundedness, then the dual will have no optimal solution because of infeasibility.

CPM & PERT: DISTINCTION BETWEEN PERT AND CPM

The PERT and CPM models are similar in terms of their basic structure, rationale and mode of analysis. However, there are certain distinctions between PERT and CPM networks which are enumerated below:

1. CPM is activity oriented i.e. CPM network is built on the basis of activities. Also results of various calculations are considered in terms of activities of the project. On the other hand, PERT is event oriented.
2. CPM is a deterministic model i.e. it does not take into account the uncertainties involved in the estimation of time for execution of a job or an activity. It completely ignores the probabilistic element of the problem. PERT, however, is a probabilistic model. It uses three estimates of the activity time; optimistic, pessimistic and most likely, with a view to take into account time uncertainty. Thus, the expected duration for each activity is probabilistic and expected duration indicates that there is fifty per probability of getting the job done within that time.
3. CPM places dual emphasis on time and cost and evaluates the trade-off between project cost and project item. By deploying additional resources, it allows the critical path project manager to manipulate project duration within certain limits so that project duration can be shortened at an optimal cost. On the other hand, PERT is primarily concerned with time. It helps the manager to schedule and coordinate various activities so that the project can be completed on scheduled time.
4. CPM is commonly used for those projects which are repetitive in nature and where one has prior experience of handling similar projects. PERT is generally used for those projects where time required to complete various activities are not known as prior. Thus, PERT is widely used for planning and scheduling research and development project.

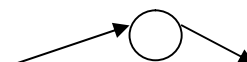
CRITICAL PATH

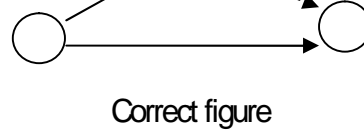
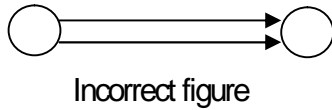
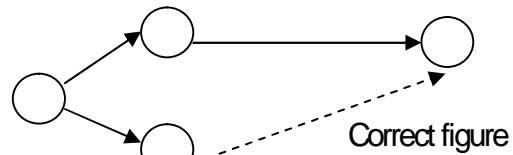
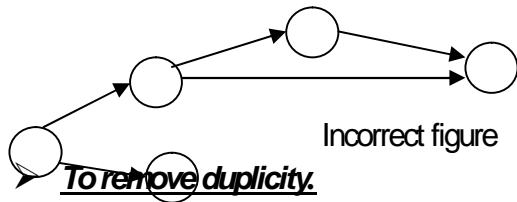
Critical Path is a chain of activities that begin with the starting event and ends with ending event of a particular project. It is that path that runs through a network with the maximum length of time or it indicates the maximum possible time required for completion of a project. Critical path indicates the minimum time that will be required to complete a project. It is determined after identifying critical events. Critical path goes through critical events. In a project network, we have to find out various ways (paths) to reach the terminal event from the initial event. Then add the durations of activities falling at each path to find out the duration of each path separately. The path having longest duration, from the durations of all the paths calculated above, will be the critical path.

DUMMY ACTIVITY

It is a hypothetical activity which consumes no resource or time. It is represented by dotted lines and is inserted in the network to clarify an activity pattern under the following situations. In the following situations we will introduce dummy activity:

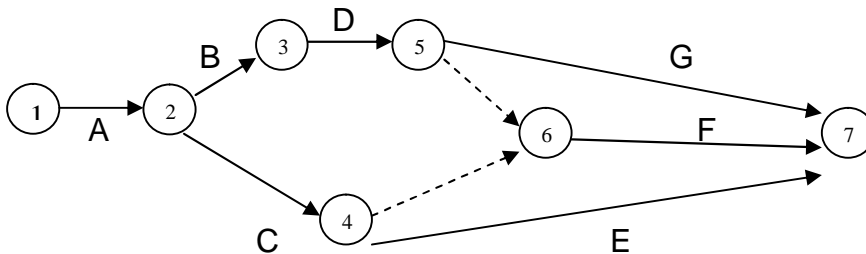
- **To connect loose ends.**





➤ For correct successor & predecessor relationship.

| Activity | Preceding activity |
|----------|--------------------|
| A | — |
| B | A |
| C | A |
| D | B |
| E | C |
| F | C, D |
| G | D |



CONCURRENT ACTIVITIES

One of the main objectives of CPM & PERT is to set co-ordination between various activities and events, in this exercise we have to group various activities such as activities that can be done one by one and the activities that can be done simultaneously without affecting the functioning of other activities, all these type of activities that can be done simultaneously are called concurrent activities. Concurrent activities play very important role in project planning, with the proper identification and coordination of these activities projects can be completed within minimum time.

RESOURCE SMOOTHING & RESOURCE LEVELING

This concept is directly related with efficient utilization of resources. In resource smoothing, although we have a plenty of resources but we want to smoothen their use, so that wastage of resources can be minimized. In resource leveling we want to smoothen the usage of resources certainly, but not at the cost of project delay and compromising with the quality. So we will not increase the duration of the project.

On the other hand in resource leveling we have resources in limited quantities and we have to complete the project with these limited resources. So in resource leveling the ultimate impact will be on project duration, the project will get delayed due to non availability of resources.

STEPS:

- (i) Convert network diagram into time scaled diagram.
- (ii) Try to shift concurrent activities by using the floats available on each activity, without delaying the project. If it is possible than the case will be the resource smoothing case.
- (iii) If it is not possible to complete the project on time due to unavailability of resources than we have to increase the duration of the project, this situation will be termed as resource leveling.

LIMITATIONS OF THE ASSUMPTION OF PERT AND CPM

1. It may not always be possible to sort out completely identifiable activities and to state where they begin and where they end
2. Activities are assumed to be independent. But the limitations on the resources may not justify the assumption.
3. Time estimates have a subjective element and to this extent, techniques could be weak. Contractors can manipulate and underestimate time in cost plus contract bids. In incentive contracts, overestimation is likely.
4. Cost-time tradeoffs / cost curve slopes are subjective and even experts may be widely off the mark even after honest deliberations
5. The formulae for expected duration and standard deviation are simplification. In certain cases, errors due to these have been found up to 33 %
6. The above errors may get compounded or may cancel each other
7. Beta distribution may not always be applicable

If there exists alternatives in outcome, they need to be incorporated by way of a decision tree analysis

LEARNING CURVE: MEANING AND USES

The first time when a new operation is performed, both the workers and the operating procedures are untried. As the operation is repeated and the workers become more familiar with work, labour efficiency increases and the labour cost per unit declines. This process continues for some time and a regular rate of decline in cost per unit can be established. This rate can be used to predict future labour costs. The learning process starts from the point when the first unit comes out of the production line. In other words 'Learning curve' is a function that measures how labour hours per unit decline as units of production increase because workers are learning and becoming better at their jobs.

Applications

1. Learning curve is useful in analysing cost volume profit relationship. The company can set low price of its product to generate high demand. As the production increases, cost per unit drops.
2. It helps in budgeting and profit planning.

3. It enables the company in price fixation. In particular, the company can fix a lower price for repeat orders.
4. It helps the design engineers to take suitable decisions based on expected rates of improvement.
5. It helps in price negotiations.
6. It is useful in setting standards and in performance evaluation.

DISTINCTIVE FEATURES OF LEARNING CURVE THEORY

As the production quantity of a given item is doubled, the cost of the item decreases at a fixed rate. This phenomenon is the basic premise on which the theory of learning curve has been formulated. In the initial stage of a new product or a new process, the learning effect pattern is so regular that the rate of decline established at the outset can be used to predict labour cost well in advance. The effect of experience on cost is summarized in the learning curve ratio or improvement ratio. And the learning curve ratio says, as the quantity produced doubles, the absolute amount of cost increase will be successively smaller but the rate of decrease will remain fixed. i.e.

$$\text{Learning curve ratio} = \frac{\text{Average labour cost of first } 2N \text{ units}}{\text{Average labour cost of first } N \text{ units}}$$

For example, if the average labour cost for the first 500 units is Rs. 25 and the average labour cost for the first 1,000 units is Rs. 20, the learning curve ratio is (Rs. 20/25) or 80%. Since the average cost per unit of 1,000 units is Rs. 20, the average cost per unit of first 2,000 units is likely to be 80% of Rs. 20 or Rs. 16.

It occurs due to the following distinctive features of manufacturing environment:

1. Better tooling methods are developed and used.
2. More productive equipments are designed and used to make the product.
3. Design bugs are detected and corrected.
4. Engineering changes decrease over time.
5. Earlier teething problems are overcome.
6. Rejections and rework tend to diminish over time.

LIMITATIONS OF LEARNING CURVE THEORY

1. All activities of a firm are not subject to learning effect. (Activities that have not been performed in the present operational mode, those performed by new or unfamiliar employees are subjected to learning effect, while those performed by familiar or experienced workmen will not be subjected to learning effect)
2. It is correct that learning effect does take place and average time taken is likely to reduce. But in practice it is highly unlikely that there will be a regular consistent rate of decrease. Therefore any cost prediction based on conventional learning curves should be viewed with caution.
3. Considerable difficulty arises in obtaining valid data that will form basis for computation of learning effect.

4. Even slight change in circumstances quickly renders the learning curve obsolete. While the regularity of conventional learning curves can be questioned, it would be wrong to ignore learning effect altogether in predicting costs for decision purposes.

SIMULATION: MEANING, USES AND PROCESS FLOW

Simulation is a quantitative procedure which describes a process by developing a model of that process and then conducting a series of organized trial and error experiments to product the behaviour of the process over time. In practical life simulation technique is useful in following manner:

1. It is not possible to develop a mathematical model and solutions without some basic assumptions.
2. It may be too costly to actually observe a system.
3. Sufficient time may not be available to allow the system to operate for a very long time.
4. Actual operation and observation of a real system may be too disruptive.

Steps in the simulation process

1. Define the problem and system you intend to simulate.
2. Formulate the model you intend to use.
3. Test the model, compare with behaviour of the actual problem environment.
4. Identify and collect data to test the model.
5. Run the simulation.
6. Analyse the results of the simulation and, if desired, change the solution you are evaluating.
7. Rerun the simulation to tests the new solution.
8. Validate the simulation i.e., increase the chances of valid inferences.

THE MONTE CARLO SIMULATION

It is the earliest mathematical Model of real situations in inventory control: Steps involved in carrying out Monte Carlo simulation are:

1. Define the problem and select the measure of effectiveness of the problem that might be inventory shortages per period.
2. Identify the variables which influence the measure of effectiveness significantly for example, number of units in inventory.
3. Determine the proper cumulative probability distribution of each variable selected with the probability on vertical axis and the values of variables on horizontal axis.
4. Get a set of random numbers.
5. Consider each random number as a decimal value of the cumulative probability distribution with the decimal enter the cumulative distribution plot from the vertical axis. Project this point horizontally, until it intersects cumulative probability distribution curve. Then project the point of intersection down into the vertical axis.
6. Then record the value generated into the formula derived from the chosen measure of

effectiveness. Solve and record the value. This value is the measure of effectiveness for that simulated value. Repeat above steps until sample is large enough for the satisfaction of the decision maker.

ADVANTAGES OF SIMULATION.

Advantages of simulation are enumerated below:

1. Simulation techniques allow experimentation with a model of the system rather than the actual operating system. Sometimes experimenting with the actual system itself could prove to be too costly and, in many cases too disruptive. For example, if you are comparing two ways of providing food service in a hospital, the confusion that would result from operating two different systems long enough to get valid observations might be too great. Similarly, the operation of a large computer central under a number of different operating alternatives might be too expensive to be feasible.
2. The non-technical managers can comprehend simulation more easily than a complex mathematical model. Simulation does not require simplifications and assumptions to the extent required in analytical solutions. A simulation model is easier to explain to management personnel since it is a description of the behaviour of some system or process.
3. Sometimes there is not sufficient time to allow the actual system to operate extensively. For example, if we were studying long-term trends in world population, we simply could not wait the required number of years to see results. Simulation allows the manager to incorporate time into an analysis. In a computer simulation of business operation the manager can compress the result of several years or periods into a few minutes of running time.
4. Simulation allows a user to analyze these large complex problems for which analytical results are not available. For example, in an inventory problem if the distribution for demand and lead time for an item follow a standard distribution, such as the poisson distribution, then a mathematical or analytical solution can be found. However, when mathematically convenient distributions are not applicable to the problem, an analytical analysis of the problem may be impossible. A simulation model is a useful solution procedure for such problems.

LIMITATIONS OF SIMULATION

1. Choice of random numbers is subjective.
2. Probability distribution based on past data may not reflect the future.
3. Number of iterations to achieve a desired result is a subjective affair.
4. It provides naïve approximations for significant decisions like capital budgeting, holding stock levels etc.
5. It is a time consuming and long exercise.
6. It generates a way of evaluating solutions but does not generate the solution itself.
7. All situations cannot be converted into simulation models.
8. Different iterations may provide different solutions and cause confusion to the evaluator

7: VALUE CHAIN ANALYSIS

Value Chain Analysis

Value chain is the linked set of value creating activities from the basic raw materials and components sources to the ultimate end user of the product or service delivered to the customer.

The six business functions contained in the value chain are (i) Research and Development, (ii) Design, (iii) Production, (iv) Marketing, (v) Distribution and (vi) Customer service.

The objective of value chain is to serve as means of increasing the customer satisfaction and managing costs effectively. Coordination of the individual parts of the value chain activities creates conditions to improve customer satisfaction in terms of cost efficiency, quality and delivery. A firm which performs value chain activities more efficiently and at a lower cost than its competitors will be able to gain competitive advantage. The following methodology should be adopted.

1. The firm should identify the industry value chain and then assign costs, revenues and assets to value activities.
2. Diagnose the cost drivers regulating each value activity.
3. Develop sustainable cost advantage either by controlling cost drivers better than competitors or by reconfiguring the chain value.

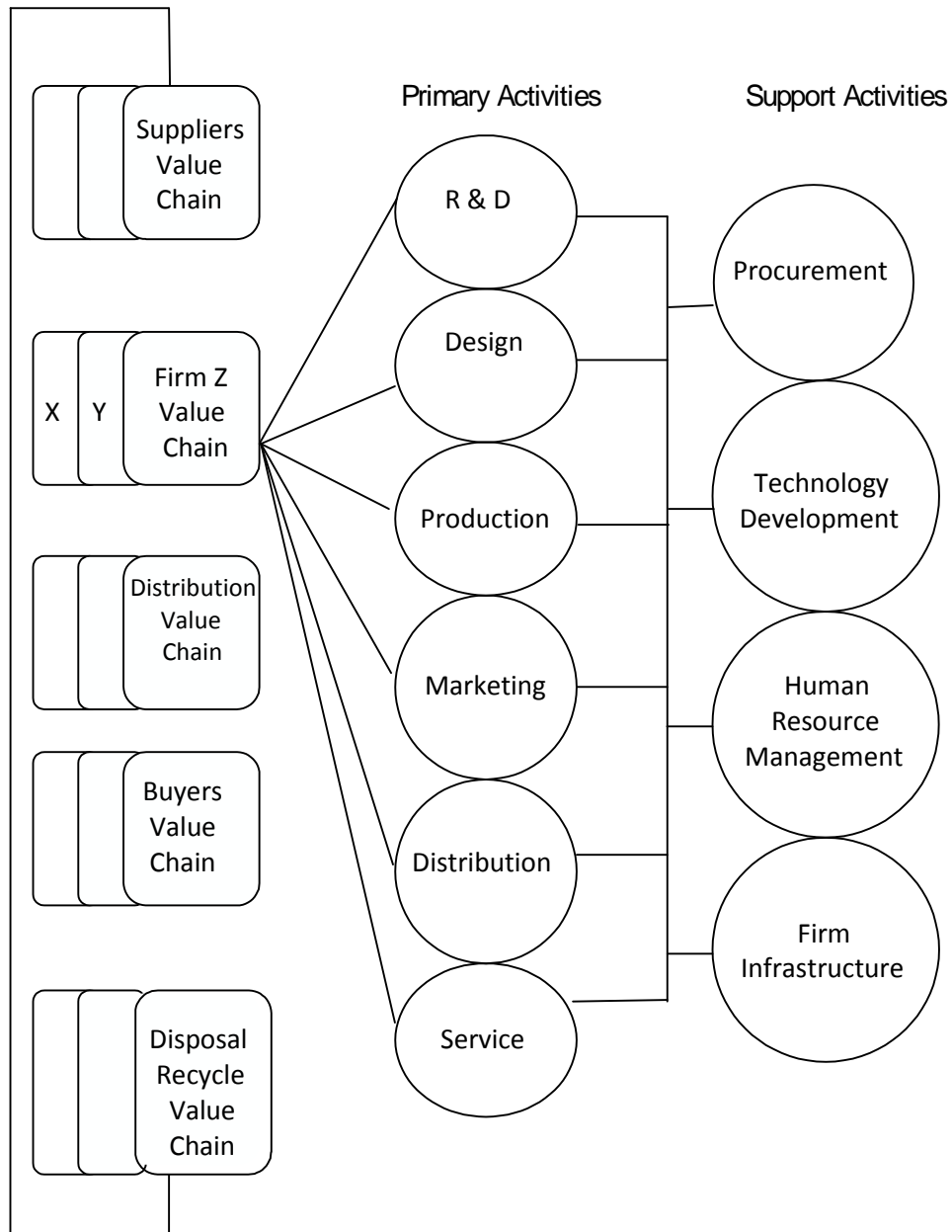
By analyzing costs, revenues and assets in each activity systematically a company can achieve low cost. Thus value chain helps managers in deciding how to apply the organization's valuable physical and human resources to each linked process so as to achieve cost effectiveness.

Value chain is the series of internal processes or activities a company performs, "to design, produce, market, deliver and support its product. A firm's value chain and the way it performs individual activities are a reflection of its history, its strategy, its approach of implementing its strategy, and the underlying economics of the activities themselves."

The value chain for any firm is the value – creating activities all the way from basic raw material sources, from component suppliers through to the ultimate end-use product delivered into the final consumers' hands.

Industry Value Chain

Value Chain Activities within the firm



Classification of business activities for VCA purpose:

Business activities can be classified into: (a) Primary or Line activities and (b) Support activities

- (a) **Primary activities** are directly involved in transforming inputs into outputs and delivery and after sales support to output. They are handled by line functions in an organisation. They include:
- Material handling and warehousing
 - Transforming inputs into final product
 - Order processing and distribution
 - Communication, pricing and channel management, and
 - Installation, repair and parts replacement
- (b) **Support activities** are activities that support primary activities. They are handled by the organisation's staff functions and include:
- Procurement – purchasing of raw materials, supplies and other consumable items as well as assets.
 - Technology Development – know-how, procedures and technological inputs needed in every value chain activity.
 - Human resource management – Selection, promotion and placement, appraisal, rewards;
 - Management development and labour / employee relations.
 - Firm Infrastructure – general management, planning, finance, accounting, legal government affairs and quality management.

QUESTION:

In Value Chain analysis business activities are classified into primary activities and support activities. Classify the following under the more appropriate activity:

- (i) Order processing and distribution
- (ii) Installation, repair and parts replacement
- (iii) Purchase of raw materials and other consumable stores
- (iv) Transforming input into final products
- (v) Selection, promotion appraisal and employee relations
- (vi) Material handling and warehousing
- (vii) General management, planning, finance, accounting
- (viii) Communication, pricing and channel management.

Firm's competitive advantage

To survive and prosper in an industry, a firm must meet two criteria: (1) Supply what customers want to buy, and (2) Survive competition. A firm's overall Competitive Advantage is derived from the difference between Value Offered to Customers and Cost of creating that customer value. This Competitive advantage takes two possible forms (1) Differentiation Advantage and (2) Low-Cost Advantage. A comparative analysis of these forms is given below:

| Differentiation Advantage | Low - Cost Advantage |
|---|--|
| It occurs when customers perceive that a firm's product offering is of higher quality, involves less risk and/ or outperforms competing products offered by competitors. Customers are thus willing to pay a premium price for this product. | A firm enjoys a relative low-cost advantage if its total costs are lower than the market average. |
| Gained by: <ul style="list-style-type: none"> ❖ Ability to deliver goods & services in timely manner ❖ Producing better quality ❖ Provision of after-sales support services ❖ Offering a wider range of goods and services etc. | Gained by: <ul style="list-style-type: none"> ❖ Access to low cost raw material ❖ Innovative process technology ❖ Access to distribution channels ❖ Economies of scale ❖ Superior operating management etc. |
| Advantage can be exploited by: <ul style="list-style-type: none"> ❖ Increasing prices to offsets the improvement in customer benefits thus maintaining current market share; or ❖ Pricing below the 'full-premium' level in order to build market share. | Can be exploited by: <ul style="list-style-type: none"> ❖ Pricing the products lower than it's competitor's so as to gain market share and maintain current profitability or, ❖ Matching with the price of competing products and increase its profitability. |
| Superior relative differentiation position offers the customers better value for an equivalent price. | Superior relative cost position offers customers equivalent value for a lower price. |

How value chain approach help an organization to assess its competitive advantage.

Use of VCA to assess competitive advantage: A company can gain competitive advantage not just by matching or surpassing its competitors, but discovering what the customers want and then profitably satisfying and even exceeding, customer expectations. This is done by a concept called Value Chain analysis (VCA). VCA can be used to better understand which segment, distribution channels, price points, product differentiation, selling propositions and value chain configurations will yield the firms the greatest competitive advantage.

Use of VCA to assess competitive advantage involves the following analyses:

1. **Internal Cost analysis** – to determine the sources of differentiation (including the cost) within internal value-creating processes.
2. **Internal Differentiation analysis** – to under the sources of differentiation (including the cost) within internal value-creating processes; and
3. **Vertical Linkage analysis** – to understand the relationships and associated costs among external suppliers and customers in order to maximize the value delivered to customers and to minimize cost.

The following actions and steps are involved in the above analyses:

| Stage | Description |
|-------|---|
| 1. | <p>Internal Cost Analysis:</p> <ul style="list-style-type: none"> ❖ Identify the firm's value creating processes ❖ Determine the portion of the total cost of the product or services attributable to each value-creating process. ❖ Identify the cost drivers for each process. ❖ Identify the links between processes ❖ Evaluate the opportunities for achieving relative cost advantage. |
| 2. | <p>Internal Differentiation Analysis:</p> <ul style="list-style-type: none"> ❖ Identify the industry's value creating processes ❖ Evaluate differentiation strategies for enhancing customer value ❖ Determine the best sustainable differentiation strategies |
| 3. | <p>Vertical Linkage Analysis</p> <ul style="list-style-type: none"> ❖ Identify the industry's value chain and assign costs, revenues and assets to value-creating processes. ❖ Diagnose the cost drivers for each value-creating process; and ❖ Evaluate the opportunities for sustainable competitive advantage |

Features of this analysis:

1. **Not mutually exclusive** – Firms begin by focusing on their internal operations and gradually widening their focus to consider their competitive position within their industry.
2. **Continuous** – VCA is a continuous process of gaining competitive advantage not a one- time affair.
3. **Part of Strategic Planning:** VCA is a process of gathering, evaluating and communicating information for business decision-making.

Steps involved in Internal Cost Analysis

1. Identify the firm's value-creating processes

- Traditionally, the firm organizes itself into departments based on cost, revenue profit and investment centers. These centers are useful for control but are not very useful for identifying value-creating processes.
- Adopting a process perspective requires a horizontal view of the organization beginning with product inputs and ending with outputs and customers.
- Processes are structured and measured sets of activities designed to produce a specified output for a particular customer or market.
- Emphasising process means focusing not on what work is done but on how work is done within the organization.
- Process Structure differs from traditional hierarchical structure and shows how the organization delivers customer value. While it is not possible to measure or improve hierarchical structure in any absolute sense, processes lend themselves to such measures as cost, time, output quality and customer satisfaction.

2. Determine the portion of total cost of the product/service attributable to each value creating process:

- A full-cost approach provides the best estimate of life-cycle costs for evaluating the strategic

cost advantage of a firm's value-creating process.

- For estimating the full cost of each value-creating activity, full utilization of the capacity of the activity or its practical capacity is normally used. Facility managers and equipment vendors are useful sources of capacity estimates. When cost vary dramatically, companies should seek more information for a more realistic long-term estimate of capacity.

3. Identify the cost drivers for each process

- By listing cost drivers, a firm can assign priorities among its cost improvement initiatives.
- In order to determine its relative cost advantage, a firm should also know the cost factors of its competitors.
- Multiple cost drivers are identified for each value-creating process. These may be classified into (a) Structural cost drivers (covering aspects such as Scale, Scope, learning, Technology and Complexity etc.) and (b) Executional Cost Drivers (Capacity utilization, Plant layout, Product design, Employee participation, Supplier and Customer liaison, etc.)

| Structural Cost Drivers | Executional Cost Drivers |
|--|--|
| <ul style="list-style-type: none"> ❖ They consist of organizational factors that determine the economic structure driving the cost of firm's product. ❖ These cost drivers reflect a firm's long term firm in its decisions, which position the industry and marketplace. ❖ Structural cost drivers may change. ❖ Example: Large pharmaceutical companies enjoy economies of scale that lower their unit costs for expensive R&D | <ul style="list-style-type: none"> ❖ They capture a firm's operational decisions on how and best to employ its resources to achieve its goals objectives. ❖ These cost drivers are determined by management policy, style and culture. They are comparatively short term. ❖ Executional cost drivers may improve. ❖ Example:-Worker empowerment and flattened continuous organization help many firms in their improvement efforts |

4. Identify the links between processes

Activities within a value chain are interdependent and hence firms must identify value chain linkages among interdependent activities that may impact their total cost. Cost improvement programs in one value chain process may lower or increase costs and/or revenues in other processes. Transfer of goods and services from one value chain process to another increases cost. Eliminating these transfer or costs has an impact on overall costs in the subsequent chain. Such linkage offer sustainable competitive advantage, because of their subtle, complex and inimitable nature.

5. Evaluate the opportunities for achieving relative cost advantage

Using the value chain approach, a company goes beyond simple across-the-board cuts and attempts to lower cost and improve efficiency within each value-creating process. For instance a company might negotiate lower costs of process inputs such as wages or purchases, or evaluate make-or-buy options.

Reducing process input costs may consist of measures such as negotiating lower wages, moving production to countries with cheaper labour costs, entering into long term contracts with suppliers at reduced prices, etc. Companies also use buyer-seller partnerships to gain advantages in cost quality, flexibility, delivery and, technology.

Using Pareto Analysis company should prioritize its value-creating processes since 20% of value creating processes often account for 80% of total costs.

Steps in Internal Differentiation Analysis (Stage 2)

1. **Identify the customers' value-creating processes:** To pursue a superior differentiation strategy, a firm's processes must enhance the value of its customers. Therefore, a firm should carefully study the value-creating processes of its customers.
2. **Evaluate differentiation strategies for enhancing customer value:** This involves identification of the value-creating processes that distinguishes a firm's products or services from those of its competitors. This can be achieved in the following areas:
 - (a) **Product Features** - that are aesthetically or functionally superior
 - (b) **Marketing Channels** – that provide desired levels of responsiveness, convenience, variety and information.
 - (c) **Service and Support** – tailored to meet end-user and channel member (sophistication and urgency or need).
 - (d) **Brand / lineage Positioning** – that lends greater appeal to the company's products on critical selection criteria.
 - (e) **Price:** including both net purchase price and cost savings available to the customer through the financial services market.
3. **Determine the best sustainable differentiation strategies:**

In order to prioritize its processes as sources of differentiation, a company must determine what attributes of each process enhance customer value. The more unique a firm's resources and skills, the more sustainable is its differentiation advantage over competitors.

Steps in Vertical Linkage Analysis (Stage 3)

Vertical linkage analysis is a much broader application of internal cost and differentiation analysis that includes all upstream and downstream value-creating processes throughout the industry. It considers all links from the source of raw materials to the disposal and/or recycling of the product. It involves the following steps:

1. **Identify the industry's value chain and assign costs, revenues and assets to value creating processes.**
 - The firm should identify the vertical linkages in the industry value chain, for example, the petroleum industry consist of numerous value creating processes or activities, including exploration, production, refining, marketing and distribution, which define the value chain for this industry.
 - One firm may participate in all parts of this value chain; another firm may participate in only a few.
 - The information systems to identify and analyse these subtle relationship should be developed.
 - Costs, Revenues and Assets of each value-creating process may be determined based on relevant cost approach, use of market prices, transfer prices, current replacement cost of assets, etc.

2. **Diagnose the cost drivers for each value-creating process:**
 - Different cost determinants should be identified for each value-creating process.
 - Direct labour-based measures may be suitable for labour-intensive activities while operating hours may be appropriate for machine based activities.
3. **Evaluate the opportunities for sustainable competitive advantage:**
 - Sufficient qualitative information usually exists on a firm's major value-creating processes and the strategies for each. Such information will be difficult to obtain and may also be unreliable.
 - Using benchmarking processes and by understanding how other companies compete in each process of the industry value chain, a firm can use the qualitative analysis to seek out competitive niches even if financial data are unavailable.
 - To evaluate the opportunities for competitive advantage in the global marketplace, firms need to consider such things as a country's values, political climate, environmental concerns, trade relations, tax laws, inflation rates and currency fluctuations.

Limitations of Value Chain Analysis

1. **Non-availability of data:** Internal data on costs, revenues and assets used for value chain analysis are derived from financial information of a single period. For long-term strategic decision-making, changes in cost structures, market prices and capital investments etc. may not be readily available.
2. **Identification of stages:** Identifying stages in an industry's value chain, is limited by the ability to locate at least one firm that participates in a specific stage. Breaking a value stage into two or more stages when an outside firm does not compete in these stages is strictly judgment.
3. **Ascertainment of cost, revenues and assets:** Finding the costs revenues and assets for each value chain activity poses/gives rise to serious difficulties. There is no scientific approach and much depends upon trial and error and experimentation methods.
4. **Identification of cost drivers:** Isolating cost drivers for each value-creating activity, identifying value chain linkages across activities, and computing supplier and customer profit margins present serious challenges.
5. **Resistance from employees:** Value chain analysis is not easily understandable to all employees and hence may face resistance from employees as well as managers.
6. **Science Vs. Art:** Value chain analysis is not an exact science. It is more "art" than preparing precise accounting reports. Certain judgments and factors of analysis are purely subjective and differ from person to person.

Difference between traditional management accounting & value chain analysis.

| | Traditional Management Accounting | Value Chain analysis |
|----------------------------------|---|--|
| Focus | Internal | External |
| Perspective | Seeks cost reduction in Value added process i.e. Sale Price - Cost of Raw materials. | Seeks competitive advantage based entire set linked activities from suppliers to end-user/customers. |
| Number of Cost Drivers | A single cost driver is adopted. Cost is generally based on volume production and sales. | Multiple cost drivers are adopted: ❖ Structural drivers (e.g. scale, scope, experience, technology and complexity) ❖ Executional drivers (e.g., participation management and plant layout. |
| Use of Cost Driver | Application at the overall firm level (cost-volume-profit analysis) | A set of unique cost drivers is used for each value activity. |
| Cost Containment Philosophy | Seeks ad hoc cost reduction solutions by focusing on variance analysis, performance evaluation based on financial and quantitative data | View cost containment as a function of the cost drivers regulating each value activity. Exploit linkages with suppliers ❖ Exploit linkages with customers ❖ Exploit process linkages within the firm ❖ "Spend to save" |
| Cost preferences | Focus on control of manufacturing costs | Focus on gaining advantage and not only on cost control and reduction. |
| Nature of data | Internal Information | External and internal information |
| Benchmarking | Partially present Inter- finance comparison, if any, is generally restricted to financial and operational information. | Focus on full-fledged benchmarking learning from competitors but exploiting one's own strengths gain advantage. |
| Insights for Strategic decisions | Limited to some extent | Identify cost drivers at the individual activity level and develop cost/differentiation advantage either by controlling those drivers better than competing by reconfiguring the value chain, Quantify and assess "supplier power" and "buyer power" a exploit linkages with suppliers and buyers. |