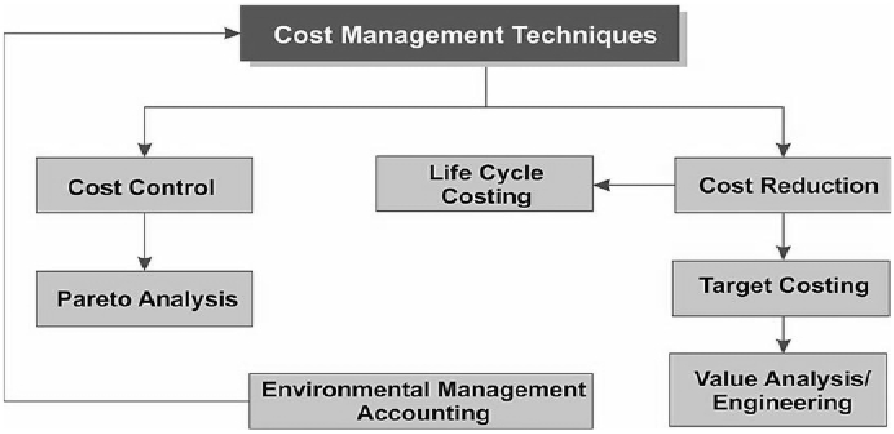
REVISION NOTES OF CLASS NO-4

Cost Management Techniques

CHAPTER OVERVIEW



Target Costing

It can be defined as a structures approach to determining 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".

In Target Costing, we first determine what price we think the consumer will pay for our product. We then determine how much of a profit margin we expect and subject that from the final price. The remaining amount left is what is available as budget to be used to create the product.

Question 1:-What are the Main features of Target Costing System

Answer:-The main features of Target Costing System can be understood by going through the following points:

A:- Target costing is viewed as an integral part of the design and introduction of new products. As such, it is part of an overall profit management process, rather than simply a tool for cost reduction and cost management. The first part of the process is driven by customer, market and profitability considerations. Given that profitability is critical for survival, a target pro fit margin is established for all new product offerings. The target profit margin is derived from the company 's long-term business plan, which incorporates its long-term strategic intent and profit margins. Each product or product line is required to earn at least the target profit margin.

B:- For any given product, a target selling price is determined using various sales forecasting techniques. Critical to setting the target selling price are the design specifications (reflecting certain levels of functionality and quality) of the new product. These specifications are based on customer requirements and expectations and are often influenced by the offerings of competitors. Importantly, while setting the target selling price, competitive conditions and customer's demand for increased functionality and higher quality, without significant increases in price, are clearly recognized, as charging a price premium may not be sustainable. Hence, the target selling price is market-driven and should encompass a realistic reflection of the competitive environment.

C:- Integral to setting the target selling price is the establishment of target production volumes, given the relationship between price and volume. The expected targets volumes are also critical to computing unit costs, especially with respect to capacity-related costs (such as tooling costs), as product costs are dependent upon the production levels over the life cycle of the product. Once the target selling price and required profit margin have been determined, the difference between these two figures indicates the allowable cost for the product. Ideally, the allowable cost becomes the target cost for the product. However, in many cases the target cost agreed upon will exceed the allowable cost, given the realities associated with existing capacities and capabilities.

D:- Establishing Cost Reduction Targets. The next stage of the target costing process is to determine cost reduction targets. Some firms will do this by estimating the "current cost" of the new product. The current cost is based on existing technologies and components, but encompasses the functionalities and quality requirements of the new product. The difference between the current cost and the target cost indicates the required cost reduction that is needed. This amount may be divided into a target cost-reduction objective and a strategic cost- reduction challenge. The former is viewed as being achievable (yet still a very challenging target), while the latter acknowledges current inherent limitations. After analyzing the cost reduction objective, a product-level target cost is set which is the difference between the current cost and the target cost-reduction objective.

E:- It should be noted that a fair degree of judgment is needed where the allowable cost and the target cost differ. As the ideal is to produce at the allowable cost, it is important that the difference is not too great. Once the product-level target cost is set, however, it generally cannot be changed, and the challenge for those involved is to meet this target.

F:- Having achieved consensus about the product-level target cost, a series of intense activities commence to translate the cost challenge into reality. These activities continue throughout the design stage up until the point when the new product goes into production.

Advantages of Target Costing

- Proactive approach to cost management.
- It reinforces top-to-bottom commitment to process and product innovation, and is aimed at identifying issues to be resolved, in order to achieve some competitive advantage.
- Target costing starts with customer's study or market study. 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.
- 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.
- Target costing ensures proper planning well ahead of actual production and marketing.
- Implementation of Target Costing enhances employee awareness and empowerment.
- Foster partnership with suppliers.
- Minimize non-value-added activities.
- Encourages selection of lowest cost value added activities.
- Reduced time to market.
- Target Costing takes a market – driven approach towards cost, in which value is defined not only by what customers demand but also by what they are willing to pay for. This strategy introduces a discipline in which planning focus shifts to those costs that create value and meet the needs of the customer. By involving and educating customers, target costing provides a process that allows teams to make intelligent trade-offs between features, functionality and cost, resulting in designs that are better suited to customer's quality and price expectations.

Question 2:- Most Useful Situations for Target Costing

Answer:- Target costing is most useful in situations where the majority of product costs are locked in during the product design phase. This is the case for most manufactured products, but few services. In the services area, such as consulting, the bulk of all activities can be reconfigured for cost reduction during the "production" phase, which is when services are being provided directly to the customer.

In the services environment, the "design team" is still present but is more commonly concerned with streamlining the activities conducted by the employees providing the service, which can continue to be enhanced at any time, not just when the initial services process is being laid out.

Whenever a new and innovative approach to doing business is discovered, the question arises as to which clients and potential clients might this methodology provide an appropriate fit. In addition, and consistent with many new financial or operational approaches, target costing may not be for everyone. Some companies, which seem to benefit most from target costing, are those, which maintain the following criteria:

- Assembly-oriented industries, as opposed to repetitive-process industries that produce homogeneous products;
- Involved heavily with the diversification of the product lines;
- Use technologies of factory automation, including computer-aided design, flexible manufacturing systems, office automation, and computer-aided manufacturing;
- Have experienced shorter product life cycles where the pay-back for factory automation typically must be achieved in less than eight years;
- Must develop systems for reducing costs during the planning, design and development phases of a product's life cycle;
- Are implementing management methods such as just-in-time, value engineering.

The above listing is not completely exhaustive as a variety of factors are at work to promote the usefulness of target costing in other companies.

Question 3:-What are the Problems with Target Costing.

Answer:-Though the target costing system results in clear, substantial benefits in most cases, it has a few problems that one should be aware of and guard against.

These problems are as follows:

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. This occurrence is most common when the project manager is unwilling to "pull the plug" on a design project that cannot meet its costing goals within a reasonable time frame. Usually, if there is no evidence of rapid progress toward a specific target cost within a relatively short period of time, it is better to either ditch a project or at least shelve it for a short time and then try again, on the assumption that new cost reduction methods or less expensive materials will be available in the near future that will make the target cost an achievable one.

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. For example, the industrial engineering staff will not be happy if it is required to completely alter the production layout in order to generate cost savings, while the purchase staff is not required to make any cost reductions through supplier negotiations. Avoiding this problem requires strong interpersonal and negotiation skills on the part of the project manager.

3:- Representatives from number of departments on the design team can sometimes make it more difficult to reach a consensus on the proper design because there are too many opinions regarding design issues. This is a major problem when there are particularly stubborn people on the design team who are holding out for specific product features. Resolving out is difficult and requires a strong team manager, as well as a long-term commitment on the part of a company to weed out those who are not willing to act in the best interests of the team.

4:- Effective implementation and use requires the development of detailed cost data. This can be really costly and may not be profitable for the company when a detailed cost-benefit analysis is done.

5:- Use of target costing may reduce the quality of products due to the use of cheap components which may be of inferior quality.

6:- For every problem area outlined have the dominant solution is retaining strong control over the design teams, which calls for a good team leader. This person must have an exceptional knowledge of the design process, good interpersonal skills, and a commitment to staying within both time and cost budgets for a design project.

Question 4:- Components of Target Costing System

Answer:-Typically, the total target is broken down into its various components, each component is studied and opportunities for cost reductions are identified. These activities are often referred to as Value Analysis (VA) and Value Engineering (VE).

Value Analysis(also known as value engineering) is a systematic inter disciplinarian examine of factory affecting the cost of a product or service in order to devise means of achieving the specified purpose of the required standard of quality and rehabilitation at the target cost. The aim of value analysis is to achieved and assigned target cost by (I) identifying improved product designs that

reduce the products cost with the sacrificing functionality and/or (ii) eliminating unnecessary functions that increase the products cost and for which customers are not prepared to pay extra.

Value analysis required the use of functional analysis. This process involves decomposing the product into its many elements or attributes. For example in the case of automobiles, functions might consist of style, comfort, operability, reliability, quality, attractiveness and many others (Kato, 1993). A price of value for each element is determined which reflects the amount the customer is prepared to pay. To this information companies normally conduct surveys and interview with customers. The cost of function of a product is compared with the benefits perceived by the customers. If the cost of function exceed the benefits to the customer, then the function should be either eliminated, modified reduce its cost, or enhanced in terms of its perceived value so that its value exceeds the cost. A focusing on the product’s functions, the design team will often consider components that performed same function in other products, thus increasing the possibility of using standard component reducing costs.

Value Analysis is a planned, scientific approach to cost reduction which reviews the material composition of a product and production design so that modifications and improvements can be made which do not reduce the value of the product to the customer or to the user.

Value Engineering is the application of value analysis to new products. Value engineering relates closely to target costing as it is cost avoidance or cost reduction before production. Value analysis is cost avoidance or cost reduction of a product already in production; both adopt the same approach i.e. a complete audit of the product. Here are some of the issues that are dealt with during a Value Analysis/Value Engineering review:

Here are some of the issues that are dealt with during a Value Analysis/ Value Engineering review:-

- Can we eliminate functions from the production process?

  This involves a detailed review of the entire manufacturing process and determine the non- value added activities. By
- eliminating them, one can take their associated direct or overhead costs out of the product cost. However, these functions were originally put in for a reason, so the team must be careful to develop work-around steps that eliminate one or more activities from the original set of functions and be sure enough that eliminating these activities will not hamper the value- added activities in any manner.
- Can we eliminate some durability or reliability?

  It is possible to design an excessive degree of sturdiness into a product. For example, a vacuum cleaner can be designed to
- withstand a 1-ton impact, although there is only the most vanishing chance that such an impact will ever occur; designing it to withstand an impact of 100 pounds may account for 99.999% of all probable impacts, while also eliminating a great deal of structural material from the design. However, this concept can be taken too far, resulting in a visible reduction in durability or reliability, so any designs that have had their structural integrity reduced must be thoroughly tested to ensure that they meet all design standards.
- Can we minimize the design?

  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 overhead is associated with the product. However, reducing a product to extremes, perhaps from dozens of components to just a few molded or prefabricated parts, can result in excessively high costs for these few remaining parts, since they may be so complex or custom made in nature that it would be less expensive to settle for a few extra standard parts that are more easily and cheaply obtained. Also, a proper trade-off between price and quality is necessary in this context.
- Can we design the product better for the manufacturing process?

  Also, known as design for manufacture and assembly, this 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 (even worse) product recalls from customers who have already received defective goods.
- Can we substitute parts?

  This approach encourages the search for less expensive components or materials that can replace more expensive parts currently

- used in a product design. It is becoming an increasingly valid approach since new materials are being developed every year. However ,sometimes the use of a different material impacts the types of materials that can be used elsewhere in the product, which may result in cost increases in these other areas, for a net increase in costs. Thus, any parts substitution must be accompanied by a review of related changes elsewhere in the design. This step is also known as component parts analysis and involves one extra activity—tracking the intentions of suppliers to continue producing parts in the future; if parts will not be available, they must be eliminated from the product design.
- Can we combine steps?

  A detailed review of all the processes associated with a product sometimes reveals that some steps can be consolidated, which may mean that one can be eliminated (as noted earlier) or that several can be accomplished by one person, rather than having people in widely disparate parts of the production process perform them. This is also known as process centering. By combining steps in this manner, we can eliminate some of the transfer and queue time from the production process, which in turn reduces the chance that parts will be damaged during these transfers.
- Can we take supplier's assistance?

  Another approach to value engineering is to call on the services of a company's suppliers to assist in the cost reduction effort.
- These organizations are particularly suited to contribute information concerning enhanced types of technology of materials, since they may specialize in areas that a company has no information about. They may have also conducted extensive value engineering for the components they manufacture, resulting in advanced designs that a company may be able to incorporate into its new products. Suppliers may have also redesigned their production processes, or can be assisted by a company's engineers in doing so, producing cost reductions or decreased production waste that can be translated into lower component costs for the company.

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CASE SENARIO:- (Case Study:- Value Analysis)- Chapter -4

Question 5:-Queenstown Wood Co. (QWC) began 20 years ago, as a small family-run business supplying custom-made school furniture. Now QWC has grown into a thriving hub of experts specializing in either custom-made, locally sourced or quality imported commercial grade furniture. The newly appointed CFO is concerned about the trends in dropping sales volumes, increasing costs, and hence falling profits over the last three years. He observed that the reason of these trends is increased cut-throat competition that has emerged over the last three years. For many years, QWC has been known for high quality but now this quality is being matched by the competitors.

QWC's share of the market is declining due to equivalent products being sold by competitors at lower prices. It is considered that, to offer such low prices, the furniture's production costs of the competitors must be lower than QWC's.

Required:-

ADVISE how QWC can improve its sales volumes, costs and profits using Value Analysis and Functional Analysis.

Solution:- Value Analysis is viewed as a reduction in cost and problem solving technique. Such technique analyses an existing product to identify and cutback or eliminate any cost which do not give any contribution to performance or value. It is a planned, scientific approach to cost reduction which reviews the material composition of a product and production design so that modifications and improvements can be made which do not reduce the value of the product to the customer or to the user. (i.e. quality for purpose should not be compromised.)

Functional analysis is applied to the design of new products and breaks the product down into functional parts. For example, a new chair may have the moveable feature. The value that the customer places on each feature is considered and added to give a target cost. Thus, functional analysis aims to increase profits by reducing costs through elimination of unnecessary features and/or by adding cost- effective new features that are so attractive to customers that the product becomes more lucrative.

The result of the above analysis is to improve the value of the furniture while maintaining costs and/or cutback the costs of the furniture without compromising with value. It is clear from the scenario that QWC needs to cut back its selling prices to compete in the market. This selling price reduction can only be possible by a reduction in QWC's unit costs; however, such reduction must not be accomplished by compromising with quality. Both value analysis and functional cost analysis may be used for QWC; however, value analysis is likely to be a more useful technique because office tables and chairs are such items which are demanded more on the basis of their use value rather than their esteem value.

Case Scenario:- Based on Target Costing

Question 6:-Kaveri Ltd. (KL) is a manufacturer of bikes in India and it sells them in India and outside India. KL has just launched the World's smallest and most affordable bike called 'Zingaroo'. The bike is mounted with all- aluminum, single cylinder, air cooled, 99.2 cc engine. The engine makes just over 8 bhp power and 8 Nm of torque, but it stakes claim to be the fuel- efficient bike, with a claimed figure of 88 kmpl. It has been creating competition for two wheelers as none of the Indian companies as well as foreign companies, offer a bike for such a competitive price within the reach of middle class family.

KL has adopted target costing technique in manufacturing this bike. For KL, maintaining target-price was difficult. During the

designing and production process of bike, input costs increased frequently. However, KL designed various components especially for bike to maintain the target price. Though, one curiosity how this can be done in the future when input costs are bound to increase further. Many environmentalists have opposed the manufacture of this bike, because they believe that mass production of small bike (about 2.5 lakh bike every year) will create heavy pollution. Many people believe that this small bike is not up to the safet y standards due to lightweight and use of aluminum and plastic frames. The design of this bike is entirely different from that of other bikes.

This also causes a doubt that the existing bike mechanics would be able to repair or not. Durability of bike is another issue in the Indian environment. Further, performance of 'Zingaroo' more or less depends upon the condition of roads and traffic system.

After the launch of 'Zingaroo', many other national and international automobile companies are also planning to manufacture small bike which will create tough competition in near future.

Required:

Now you being a strategic performance analyst of KL, answer the following questions:

(i) IDENTIFY strategy which KL has adopted for 'Zingaroo' bike?

(ii) After adopting target costing, IDENTIFY issues and challenges faced by KL and suggest the remedial action to be taken to solve these issues?

Solution:

(i) KL has adopted Low Cost Strategy for “Zingaroo” bike since the main purpose of manufacturing this bike was to make it cheapest and affordable.

(ii) The issues and challenges faced by KL and their remedial action are as follows:

Maintaining of Target Price

‘Zingaroo’ bike is one of the world’s cheapest and smallest bike. Maintaining target-price proved to be a big challenge for the KL since input cost of bike are bound to increase further in future. The initial value engineering may not uncover all possible cost savings. Thus, Kaizen Costing may be designed to repeat many of the value engineering steps for as long as a bike is produced, constantly refining the process and thereby stripping out extra costs.

Environmental Issues

Many environmentalists have opposed the manufacture of bike as they believe that mass production of small bikes will create h eavy pollution since automobile pollution is already a big problem for a country like India. For this issue, ‘Zingaroo’ bike can be prepared based on BS emission norms. These norms restrict the pollution created by any motor vehicle.

Safety Issues

Since ‘Zingaroo’ bike is made of aluminium and plastic frames so this may also create safety issues for the customers. For such issues, KL should meet safety standards. Further, KL should make people aware that ‘Safety is Primary’/‘Drive Safely’.

Servicing/Repairing Facilities

The design of ‘Zingaroo’ bike is entirely different from that of other bikes. This causes a doubt that the existing bike mechanics would be able to repair or not. For such problem, creation of a good network of service center can be a solution i.e. repair center should be established on required places.

Durability

Durability of ‘Zingaroo’ bike is another issue in the Indian environment. The performance of bike more or less depends upon the condition of roads and traffic system. For such issues, tyre quality and hydraulic brake system should be compatible to the roads and traffic system.

Global Competition

After the launch of ‘Zingaroo’, many other national and international automobile companies are also planning to manufacture a small bike, which will be a big challenge for the KL in the near future. To face such competition, it may adopt Kaizen Costing technique. The cost reductions resulting from Kaizen Costing are much smaller than those achieved with Value

Engineering but are still worth the effort since competitive pressures are likely to force down the price of ‘Zingaroo’ over time, and any possible cost savings allow KL to still attain its targeted profit margins while continuing to reduce cost.

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Management Accountant’s Role in a Target Costing Environment

The management accountant should be able to provide for the other members of the design team a running series of cost estimates based on initial design s sketch activities based costing with vague costing information and so must be able to provide estimates within a high-low range costs, gradually tightening this estimated cost range as more information becomes available.

The management accountant should also be responsible for any capital budgeting requests generated by the design team since he or she has the knowledge of the capital budgeting process, how to fill out the required forms. And precisely what types of equipment are needed for the anticipated product design. The management accountant also becomes the key contact on the design team for answers to any questions from the finance staff regarding issues or uncertainties in the capital budgeting proposal.

The management accountant should work with the design team to help it understand the nature of various costs. (such as cost allocation based on an activity based costing system), as well as the cost-benefit trade offs of using different design or cost operations in the new product.

In addition the management accountant is responsible for tracking the gap between the current cost of a product design and the target cost that is the design team's goal, providing an itemization of where cost savings have already been achieved and where there has not been a sufficient degree of progress.

Finally the management accountant must continue to compare a products actual cost to the target cost after the design is completed and for as long as the company sells the product. This is a necessary step because management must know immediately if costs are increasing beyond budgeted levels and why these increases are occurring.

There is particularly qualification that a management accountant must have to be assigned to a target costing team. Certainly one is having a good knowledge of company products as well as their features and components. Also the management accountant must know how to create an activity based costing system to evaluate related production costs, or at least interpret such costing data developed by someone else. Further he or she must work well in a team environment proactively assisting other members of the team in constantly evaluating the costs of new design concept. In addition he or she should have good analytical and presentation skills, since the ongoing costing results must be continually committee. Thus the best management accountant for this position is an outgoing person with several years of experience within a company or industry.

Life Cycle Costing

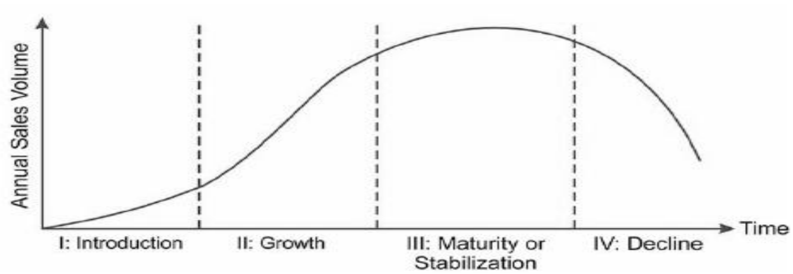
Life Cycle Costing involves identifying the costs and revenue over a product's life i.e. from inception to decline. Life cycle costing aims to maximize the profit generated from a product over its total life cycle. Understanding this can be a useful analysis tool and can help to suggest which strategies the organisation needs to adopt in order to compete successfully.

Product Life Cycle

Each product has a life cycle. The life cycle of a product varies from a few months to several years.

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

The life cycle of a product consists of four phases/stages viz., Introduction; Growth; Maturity; **Saturation and Decline.**



Stage I: Introduction Stage

Stage one is where the new product is launched in the market. As the product is novel, there is minimal awareness and acceptance of it. Competition is almost negligible and profits are non- existent. The length of the introduction stage differs from product to product depending on various factors.

Characteristics

Decisions about the product branding, packaging and labeling	High distribution and promotional expenses	Profits are low or negative due to low initial volume
Pricing may be low-penetration or high-skimming pricing	Huge efforts to attract various marketing channels	Aggressive promotional efforts to increase awareness
Product refinements are not possible	Few competitors produce basic version of products	Focus on those buyers who are the most ready to buy

Strategies

- Attracting customers by raising awareness of the product through promotion activities.
- Inducing customers to try and buy the product.
- Strengthening or expanding channel and supply chain relationships.
- Building on the availability and visibility of the product that boost channel intermediaries to support the product.
- Setting price in alignment with the competitive realities of the market.

Stage II: Growth Stage

Characteristics

The next stage in the product life cycle is growth stage. Sales begin to expand rapidly because of greater customer awareness. Competitors enter the market often in large numbers. As a result of competition, profit starts declining near the end of the growth stage.

High volume in business and increase in competition	Sales increased at an increased rate in early growth stage	New channels to handle volumes and new markets
Shift of emphasis from product awareness to product conviction	Overall strategy for trade-off between high profits and high market share	Improving and/or adding features or strategies lowering of prices to attract more buyers
Same promotional spending or slightly higher	Educating market is main goal	The length of the growth stage varies according to the nature of the product and competitive reactions

Strategies

- Establish a clear brand identity through promotional campaigns.
- Maintain control over product quality to assure customer satisfaction.
- Maximize availability of the product through strong distribution channel.
- Find the ideal balance between price and demand as per price elasticity.

- Overall strategy shifts from acquisition to retention of customers, from motivating product trial to generating repeat purchases and building brand loyalty.
- Development of long-term relationships with customers and partners for the maturity stage.
- Value-based pricing strategies may be considered.
- Leverage the product's perceived differential advantages to secure a strong market position.

Stage III: Maturity Stage

Characteristics

During the stage of maturity sales continue to increase, but at a decreasing rate. When sales level off, profits of both producers and middlemen decline. The main reason is intense price competition; some firms extend their product lines with new models. This stage poses difficult challenges.

Overcapacity in the industry	Intensified competition	Population growth and replacement demand govern future sales
Some laggard buyers still enter the market	Profits start to decline	No new distribution channels to fill
Customers start moving towards other products and substitute	Strong marketing challenges	High R & D budgets

Strategies

- Strong marketing efforts are needed to win over the competitor's customers.
- Product features may be improved or enhanced to differentiate product from that of the competitors.
- Prices may have to be reduced to attract the price-sensitive consumers.
- Various sales promotion incentives are necessary for the consumers as well as dealers to maintain their interest in the product.
- Distribution becomes more intensive and incentives may be offered to encourage product over competing products.

Stage IV: Decline Stage

Decline in sales volume characterizes this last stage of the product life cycle. The need or demand for product disappears. Availability of better and less costly substitutes in the market accounts for the arrival of this stage.

Characteristics

Sales of most product forms drop to zero or may remain at a low level	Sales decline for a number of reasons, including technological advances, consumer's shift in taste, etc
Profits start declining and at times become negative	No of organizations producing the products drops

Strategies

- The product can be maintained in the market by differentiation, keeping low cost for some more time by adding certain new features and finding new uses.
- The firm can continue to offer the product to its loyal customers (niche segment) at a reduced price.
- Firm can even discontinue the product.
- Use the product as replacement product for launching another new product successfully in the market.
- The various marketing decisions in the decline stage will depend on the fact that, whether it is being revived, or given a new lease of file, or left unchanged if it is being liquidated.
- The price may be maintained or reduced drastically if liquidated.

Life Cycle Strategies

	Introduction	Growth	Maturity	Decline
Price	Setting Price in alignment with competitive realities of the market	Find ideal balance between Price & demand as per elasticity Value based Pricing	Price may have to be reduced to attract Price sensitive customer	At reduce price to loyal customer / Reduce drastically.
Distribution Channel	Expending/spending boosting channel by availability of Product (Support to Product)	Strong distribution channel (Max. availability of product)	To maintain distribution channel, Channel become intensive/Incentive may be offered	New features may be added, Offer at low cost
Sales/Promotion	Through Promotional activities, attract customer/awareness of product	Through sale promotion establish clear brand identity.	Sales Promotion Incentive are necessary.	Better to nil.
Customer	Effort to buy the product	Maintain control over product quality to assure customer satisfaction/ Long term relation with customer /Partner	Strong marketing efforts are needed, to win over competitor customer/ Differentiation Policy	Use the product as replacement product for launching another product/firm even discontinues the product.

Strategies Features/Characteristics

	Introduction	Growth	Maturity	Decline
Sales	**Low**	**Sales Increase at Increase Rate in early stage**	**Peak sale**	**Decline**
Price	May be low- Penetration High-Skimming	Lowering of Price to attract more customer	Competitive Price	Low
Marketing channel	Huge efforts to attract various marketing channel	New Channel to handle additional volume & new	No new distribution channel to fill strong market channel	Existing disappear

	Introduction	Growth	Maturity	Decline
Sales	**Low**	**Sales Increase at Increase Rate in early stage**	**Peak sale**	**Decline**
		market.	(Existing).	
Capacity	Spare	To be utilize	Over capacity	Spare disappear
Customer	focus to those buyer who are ready to buy	Customer Increase	Some Laggard buyer enter market customer starts moving towards other product substitute.	customer shift in taste .Technology change.
Promotional Expenditure	High	Slightly higher	High R & D	No need
Competition	Few-only basic version of Product Produces.	Increase uncompetition shift of emphasis from Product awareness to Product conviction Competition	Intensified competition	Out of Competition
Profit	Low/Negative due to low initial volume	Profit Increase	Start to decline	negative

Characteristics of Product Life Cycle

The major characteristics of product life-cycle concept are as follows:

- The products have finite lives and pass through the cycle of development, introduction, growth, maturity, decline and deletion at varying speeds.
- Product cost, revenue and profit patterns tend to follow predictable courses through the product life cycle. Profits first appear during the growth stage and after stabilizing during the maturity stage, decline thereafter to the point of deletion.
- Profit per unit varies as products move through their life cycles.
- Each stage of the product life-cycle poses different threats and opportunities that give rise to different strategic actions.
- Products require different functional emphasis in each stage-such as an R&D emphasis in the development stage and a cost control emphasis in the decline stage.
- Finding new uses or new users or getting the present users to increase their consumption may extend the life of the product.

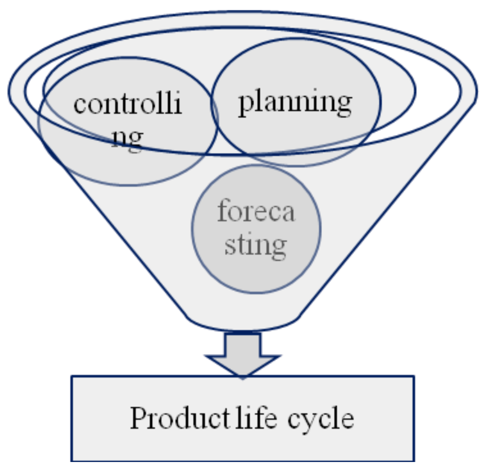
Benefits of Product Life Cycle Costing

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 the managed in order to

maximise 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.
- 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.
- It is an approach used to provide a 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.
- 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.
- Product life cycle costing traces research and design and development costs etc., 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 period.

Uses of Product Life Cycle (PLC)



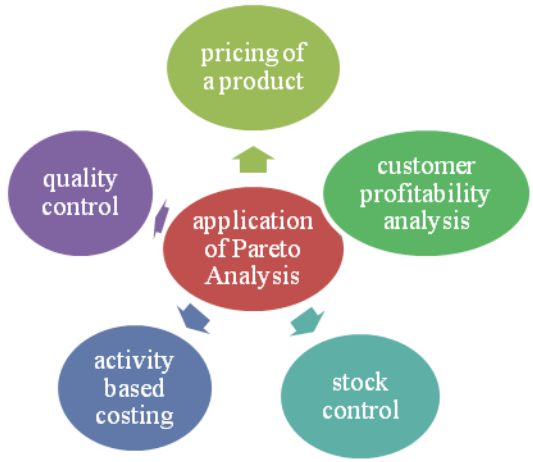
- As a Planning tool, it characterizes the marketing challenges in each stage and poses major alternative strategies, i.e. application of kaizen.
- As a Control tool, the PLC concept allows the company to measure product performance against similar products launched in the past.
- As a Forecasting tool, it is less useful because sales histories exhibit diverse patterns and the stages vary in duration.

Pareto Analysis

Pareto Analysis is a rule that recommends focus on the most important aspects of the decision making in order to simplify the process of decision making. It is based on the 80: 20 rule that was a phenomenon first observed by Vilfredo Pareto, a nineteenth century Italian economist. He noticed that 80% of the wealth of Milan was owned by 20% of its citizens. This phenomenon, or some kind of approximation of it say, (70: 30 etc.) can be observed in many different business situations. The management can use it in a number of different circumstances to direct management attention to the key control mechanism or planning aspects. It helps to clearly establish top priorities and to identify both profitable and unprofitable targets.

Application of Pareto Analysis

Pareto analysis may be applicable in the presentation of Performance Indicators data through selection of representative process characteristics that truly determine or directly or indirectly influence or conform the desired quality or performance result or outcome. The Pareto Analysis is generally applicable to the following business situations:



- 80% of Revenue generated by 20% of products.
- 80% of profit generated by 20% of customers.
- 80% of overhead cost consist by 20% of cost driver.
- 80% of storage cost held by 20% inventory
- 80% of problems generated by 20% of reasons.

Pricing of a Product

- In the case of a firm dealing with multi products, it would not be possible for it to analyse cost-profit-price-volume relationships for all of them. In practice, in case of such firm approximately 20% of products may account for about 80% of total sales revenue. Pareto Analysis is used for analysing the firm estimated sales revenues from various products and it might indicate that approximately 80% of its total sales revenue is earned from about 20% of its products.
- Such analysis helps the top management to delegate the pricing decision for approximately 80% of its products to the lower levels of management, thus freeing themselves to concentrate on the pricing decisions for products approximately 20% which are essential for the company's survival.
- Thus, a firm can adopt more sophisticated pricing methods for small proportion of products that jointly accounts for approximately 80% of total sales revenue. For the remaining 80% of the products which account for 20% of total sales revenue the firm may use cost based pricing method.

Customer Profitability Analysis

- Instead of analysing products, customers can be analysed for their relative profitability to the organisation.
- Again, it is often found that approximately 20% of customers generate 80% of the profit. There will always be some customers who are less profitable than others, just as some products are less profitable than others.
- Such an analysis is useful tool for evaluation of the portfolio of customer profile and decision making such as whether to continue serving a same customer group, what is the extent of promotion expenses to be incurred.

List of service organizations using Customer Profitability analysis:-

(a) Financial institutions like Banks and Insurance Companies.

(b) Hospitality services like Hotels, Travel Agents, and Tour operators.

(c) Professional services like Audit and Accounting Firms, Law Firms, Consultancy Firms like IT Consultancy , Management Consultancy.

(d) Hospitals and Healthcare providers.

(e) Logistics and Freight Companies that transport goods to various destinations.

Benefits of Customer Profitability Analysis:

(a) It helps the supplier to identify which customers are eroding overall profitability and which customers are contributing to it.

(b) It can help to provide a basis for constructive dialogue between buyer and seller to improve margins.

ABC Analysis- Stock Control

- Another application of Pareto analysis is in stock control where it may be found that only a few of the goods in stock make up most of the value. In practice, approximately 20% of the total quantity of stock may account for about 80% of its value. The outcome of such analysis is that by concentrating on small proportion of stock items that jointly accounts for 80% of the total value, a firm may well be able to control most of monetary investment in stocks.

Application in Activity Based Costing

In Activity Based Costing it is often said that 20% of an organisation cost drivers responsible for 80% of the total cost. By analysing, monitoring and controlling those cost drivers that cause most cost, a better control and understanding of overheads will be obtained.

Quality Control

- Pareto analysis seeks to discover from an analysis of defect report or customer complaints which "vital few" causes are responsible for most of the reported problems.
- Often, 80% of reported problems can usually be traced to 20% of the various underlying causes. By concentrating once efforts on rectifying the vital 20%, one can have the greatest immediate impact on product quality.
- The Pareto Analysis indicates how frequently each type of failure (defect) occurs. The purpose of the analysis is to direct management attention to the area where the best returns can be achieved by solving most of quality problems, perhaps just with a single action.

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Advantages of EMA

Improving Revenue

Production of new products or services meeting the environmental needs or concerns of customers can lead to increased sales. It may also be possible to sell such products for a premium price. Improved sales may also be a consequence of improving the reputation of the business.

It is possible that in the future, rather than good environmental management resulting in improved sales, poor management will lead to losses. All business will be expected to meet a minimum standard related to environmental issues.

Cost Reductions

Paying close attention to the use of resources can lead to reductions in cost. Often simple improvements in processes can lead to significant costs savings.

Disadvantages of EMA

Increases in costs

Cost of complying with legal and regulatory requirements, and additional costs to improve the environmental image of the organization may result in increase in some costs. However, some of these costs may be offset by government grants and this expenditure may save money in the long-term as measures taken may prevent future losses.

Costs of Failure

Significant costs may be incurred if there is poor environmental management. Thus the cost of clean-up and fines on violation of any government environmental

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CASE STUDY: ENVIRONMENTAL MANAGEMENT ACCOUNTING

Shandaar Bangle Ltd (SBL) have been recognized as a manufacturers and exporters of high quality Bangles, designed and manufactured using optimum quality raw material, sourced from trustworthy vendors of the market.

Manufacturing Process

The process of manufacture of glass bangles is highly skilled labour oriented one comprising of the following main operations:

Glass Melting Phase → Parison Making Phase → Spiral/Coil Forming Phase

In first phase, glass batch materials like sand, soda ash, lime stone feldspar, borax etc. with other additives and colouring materials in a suitable proportion are mixed manually and fed into the pot places in pot furnace. The raw material is melted in the furnace at a temperature of about 1300 – 1400 (°C) to obtain molten glass.

In second phase, molten glass is drawn from the pot of the furnace with the help of the iron pipe and formed into gob to gather required quantity of glass for formation into parisons on iron plates. The parisons of different colours are joined together and reheated in an auxiliary furnace to obtain required designs.

In third phase, the reheated parison is then transferred to 'Belan Furnace' from which the glass is further drawn into spiral/coil of bangles on the spindle counted and rotated manually at uniform rate of revaluation synchronizing with the manually at the other end of the furnace. Spiral are then taken out from the spindle and cut with the help of a pencil cutter to separate out the single pieces of bangles from spiral. These cut or un-joined bangles are then sent for joining of end, finishing cutting & polishing, decoration etc. The finished products are then neatly packed for sale.

Environmental Impact

But unfortunately, these processes have environmental impact at all stages of the process, including emissions of airborne pollution in the form of ashes, gases, noise and vibration.

Conditions of the Workplace

Due to limitations of maintaining appropriate temperature for melting and moulding of the glass, furnaces are kept burning. Therefore, workers have to work with such working conditions continuously without proper leisure time.

The above-mentioned factors become more harmful while working in immense heat and sound which is normally higher than permissible levels.

Health Impact

A recent study has revealed adverse impact of pollution over workers and people who are living in nearby area.

Management Initiatives

The management of company is worried about environmental impact and health impact and has taken certain initiatives in taking care of environment like- batch house cyclonic dust collector, noise absorbing device, natural gas fired furnace, better refractory materials, training for waste minimization, treatment of solid waste, research and development activities aimed at reducing pollution level, planting trees, treatment of nitrogen oxide and other harmful gases.

Required

Management desires to adopt environmental management accounting as a part of strategic decision making process.

(i) EXPLAIN the requirement to have environmental management accounting and IDENTIFY the SBL's environmental prevention, appraisal, and failure costs.

(ii) ANALYZE the appropriateness of SBL incorporating the following in implementing Environmental Management Accounting:

- Activity Based Costing
- Life Cycle Costing
- Input Output Analysis

(iii) EXPLAIN the need of non-financial consideration in decision making and suggest safety measures that can be taken into consideration for workers

Solution

Environmental management accounting (EMA) is the generation and analysis of both financial and non-financial information in order to support internal environmental management processes i.e. identification, prioritization, quantification and recording of environmental cost into business decision.

By adopting EMA, SBL will have following benefits:

- Product Pricing.
- Budgeting.
- Investment Appraisal.

- Calculating Investing Options.
- Designing, Calculating Costs, Savings and Benefits of Environment Projects.
- Setting Quantified Performance Targets.
- Assessment of Annual Environmental Costs.
- Environmental Performance Evaluation, Indicators and Benchmarking.
- External Reporting- Disclosure of Environmental Expenditures, Investments and Liabilities.

Environmental Costs of SBL

- Environmental Prevention Cost: These costs are basically incurred in relation to activities undertaken to prevent the production of waste that could harm the environment.

  Company's efforts to minimize the effect of its activities on the environment like installing batch house cyclonic dust collector, natural gas fired furnace, better refractory materials, training for waste minimization, research and development activities, noise absorbing device and planting trees can be classified as Environmental Preventive Cost.

- Environmental Appraisal Costs: It means costs incurred in relation to activities undertaken to determine whether product processes and other activities within firm are complying with environment standards.

  SBL may perform 'Contamination Test' to observe the environment compatibility of its processes can be categorized under environmental appraisal cost.

- Environmental Failure Cost: It means cost incurred in relation to activities dealing with pollution arising from the activities of entity includes costs related to treatment harmful gases and treatment of solid waste.

Appropriateness of Techniques for Identification and Allocation

Activity Based Costing

This costing technique would help the SBL to separate environmental costs from the general overheads and allocate them to glass bangles by identifying appropriate drivers of these environmental cost. Possible environment activities for environmental costs and their drivers are:

Activity	Cost Drivers
• Planting of trees	• Number of trees planted
• Treatment of nitrogen oxide (in the same way, activity and related cost driver for other gases would be determined)	• Volume of nitrogen oxide treated
• Solid waste removal	• Volume of such waste
• Research and development activities	• Man hours worked for such activities

Life Cycle Costing

By using this costing in EMA, SBL would be able to identify record and control the environmental costs relating to various stages in the life of glass bangles. At each of following stage environmental cost would be incurred:

- In raw material stage, some natural product would be purchased.
- In manufacturing stage, emission and treatment of nitrogen oxide & other gases and

treatment of solid waste.

- In marketing and distribution stage, environmental cost relating to transportation of glass bangles to various customers.

Input / Output Analysis

Here detail analysis of input and output of a system is done for the purpose of assessment of ecological wellbeing of entity's products, processes and other activities. This technique is based on the fact that whatever goes into the system has to come out of it.

In case of SBL, it can evaluate the volume of sand, soda ash, lime stone feldspar, borax etc. and the resulting volume of output i.e. glass bangles. Through such evaluation, the SBL would be able to allocate and analyses environmental cost attributable to input and output of glass bangles.

Non-Financial Considerations

Entities generally give emphasis on financial measures such as earnings and accounting returns but little emphasis on drivers of value such as customer and employee satisfaction, innovation and quality. Due to which mostly companies could not continue in long term. So for the purpose of achieving long-term organizational strategies, non-financial consideration should be taken into account. Without this it may be that company achieve short term goal but would be difficult to achieve long term goal.

In SBL, it can be clearly seen that there is great impact on health of workers. By creating safe and healthy environment for employees, SBL can improve productivity, business performance, staff morale and employee engagement. Further, SBL will also be able to reduce – accidents/work related ill health/sick pay costs as well as insurance costs. A healthy work force can demonstrate corporate responsibility. If SBL look after employees, business is likely to have a more positive public image.

To create safe and healthy environment following measures can be taken into consideration:

- Safety monitoring system.
- Workers must be trained.
- Recruitment of more workers.
- First aid kit should be available.
- Protective glasses, clothes, gloves should be provided.

Regular health check-up camps and awareness programs.

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