

Chapter 4 – Cost Management Techniques

Case Study 6 – Target Costing & Supply Chain Management

Dream Homes, a US based MNC, started its Indian operations with opening of few stores in its nascent phase. In recent times, it started running nationwide stores in India selling range of home-based products right from home improvement tools, decors, electronic appliances to small kitchen utilities like steel pans, nonstick dishes, kitchen organizers, knives, cardboards, countertop stickers, ice cream molds, chocolate molds and alike. It had gained wide popularity particularly among the ladies' group of India since its expansion of the product line. Previously it was selling just the intermittently purchased home-based products like furniture and appliances. It was the extended accessibility to daily utilities that elated the ladies' group about visiting the stores. Some women referred Dream Homes as the one stop search for all their necessities.

Dream Homes manufactured some of the products rather than making an outright purchases and sales thereof of all its products. To make various kinds of furniture and kitchen based small utilities, it derived its raw materials directly from local market which were mostly the recycled materials like plastics, scrapped items, used furniture and alike rather than the raw wood, forest products and firsthand products. Its raw materials were therefore capable of generating various forms of work in progress. The work in progress and finished product relation worked in similar fashion. From a particular WIP, it was capable of generating multiple outputs. Therefore, the firm kept its material cost low and primarily relied on the recycling process, thereby keeping up its pledge to serve the environment.

For the in-house manufactured products, the materials department of the firm functioned in the below manner:

1. The manager of the department kept a watch on each type of inventory levels in the warehouse.
2. He then estimated the required production based on historical demand and long-term forecasting policies of the firm.
3. A room was also left for safety stock so that any unforeseen delay in delivery of the goods could be covered.
4. Based on the existing inventory and production plans and safety stocks, inventory replenishment levels were calculated.
5. Once the stock reached its reordering level, an order to replenish the stock was being sent to the vendor.
6. Based on departmental orders, vendor delivered the materials.

To manufacture the finished products i.e., to convert raw material to finished good, the intervening time was 3 weeks. It will take approximately take 4 weeks to deliver the in-house manufactured product from the time order is received. The standard lead time of similar products in industry is 2.5 weeks.

For products purchased out-rightly, a purchase order was prepared by the purchasing department based on the inventory in hand and expected demand. Some of those products did show a sketchy demand pattern, with surge in demand for lame reasons. However, the department did not take into account safety stocks for any of these purchased products, since the cost to maintain such inventories were high and the costs of these products itself were high enough. The problem however was failure to meet surprise orders or sudden increase in demand.

People were getting busier and there was hardly any time to procrastinate buying things they need until they could visit the stores based on their availability. Moreover, it was just the metro cities, that had overwhelming number of stores, but states like Gujarat and Odisha remained an untapped target with very few stores only in the developed parts of the cities. Dream Homes' agenda was not just to add more variety to its existing offerings, but to reach people all around the country since it perceived manifold needs were yet unmet.

Going digital was a challenge since its popularity was limited to its store locations and therefore it was dubious of its acceptability among the nationwide customers. It was prepared for an extensive marketing of its digital channels though and funds were not a problem. Having heard about the peaking demand of businesses for E Customers, it was supportive of the idea and considered to follow the suit.

From its US operations, it was very well aware about the expectations of its E Customers and the quality of service they desire from their E Sellers. They tend to be progressively demanding and expect their orders to be processed in couple of hours after being placed.

They do not want to grapple with the tracking information of their package. They need real time update of their package location so that there are no abrupt surprises about the delivery time and the condition of the package. They like to purchase from E Sellers who offers competitive prices accompanied with free shipping and on time delivery. That is all too much for a developing market like India.

The labor cost is relatively low in India but the infrastructure is not adequately sound to guarantee the same level of service at their expected prices. Indian market is not similar to the US market, there being an immense cultural gap. The income of the middle-class people is also not remarkably high and hence they can spend sparingly on things that are not paramount on their list. Kitchen items though marked as "necessities" by the women section of the society were not real necessities in economic sense. Hence the firm thought of applying the paradigms of Target Costing to set the prices of their online products such that they remain competitive before their E Customers.

The firm also needs a flawless Supply Chain Management (SCM) System in Indian environment, but the back-office team of the firm had little knowledge about this aspect of the E Commerce project and it did not see the light of the day. Now they need you to help them shape up the SCM look of Dream Homes.

Required

Given the facts of Dream Homes, answer the following questions:

1. DISCUSS the suitability of Target Costing concept to Dream Homes?
2. Critically ASSESS its current inventory management system and RECOMMEND suitable changes in light of its business strategy.
3. ADVISE the SCM look for Dream Homes as per their requirement.

Solution

- (i) Usually, we notice a suit of prices of products being determined based on the cost of their production, keeping a room for desired margin. In contrary to this, the then originated Japanese concept tells us to estimate selling price at first place, to be determined based on the price the market is currently willing to pay for a similar product. Thus, the prices here are not based on the cost of their products rather costs have to be targeted and thus the name "Target Costing". This

means once price is determined and profits are set aside, the remainder becomes the costs to be achieved. In striving to reach the cost goal, myriad managerial techniques and tools like Value Chain Analysis/ Value Reengineering, Six Sigma, are used. These techniques are used keeping in mind the focus (i.e., to control cost in order to meet the target without compromising the quality and value to be derived from the product). As such, various costs incurred with respect to product like design cost, manufacturing cost, storage cost, transportation cost are destined to be controlled.

Target Cost concept is very much relevant in Dream Homes' situation since it is considering to digitize its business where competition is intense specifically with regards to the prices of similar products. Since the products offered by Dreams Homes lack much differentiation, the unique selling point of the firm can be to offer quality products at low prices. Further, E Commerce will mostly require the firm to operate as per Just in Time (JIT) approach that will reduce inventory maintenance burden and also reduce wastage, thereby controlling costs. Thus, Target Costing and E Commerce go hand in hand.

We must also keep in mind that the firm can apply Target Costing concept to both its manufactured products and the products purchased out-rightly. For the merchandise goods, Dream Homes can plan to control various fixed cost (i.e., storage and inspection cost) and variable cost (i.e., selling cost) incurred to handle such goods such that lower prices can appeal wider customer base. Moreover, to achieve low costs for its supplied products, it will have to enter into long term contracts with dedicated suppliers. Considering the E Market, the scope of its operations will expand and therefore the demand may also increase. Thus, suppliers can funnel the discounts in form of low prices only if a commitment for long term purchases is made by the firm.

(ii) Currently, Dream Homes operates physical stores at which time inventories of raw materials, WIP and finished products are maintained at the stores and in warehouses considering the demand directly dependent upon the store locations. It has been blocking large assets in form of various inventories piled up to coordinate its production and retail function.

The three forms of inventories related to products that Dream House manufactures are maintained in a traditional manner which seems to be out of the place for an E Retailer. Dream House forecasts demand based on its internal policies and historical trends. Today demand in every sector of the market changes by leaps and bounds, so using historical data is not at all recommended. Demand forecasts should be pulled by current market trends and prediction of future market sentiments. For example, Corona Virus pandemic has drastically changed the face of world, where demand for some products have taken a leap while some will continue sitting on the shelves for a prolonged period. People are refraining themselves from going to stores and online retailers like Amazon are reaping the benefits from this situation.

In the process of maintaining inventory, Dream Homes is also building up too much safety stock which takes up cost and space. The lead time of the firm is remarkably high relative to industry standards, which is untenable in an E Environment. Failure to accommodate customers request as per industry norms, means losing a large chunk of customers who do not want to wait.

Now when the firm is thinking of going digital, the scenario will be totally different. With the switch over to ecommerce, production and purchase mechanism will also have to undergo a

drastic change. Just in time purchasing and production technique will put an end to the harrowing task of inventory management. In this form of pull system, purchasing of merchandise goods and production of in-house goods will be based on online customer demands and Dream Homes will have to accordingly coordinate with its suppliers to supply the right quantity of raw materials required at the right time. JIT inventory management calls for having the inventory as and when needed also taking care of massive holding cost suffered related to large build ups. The trick is to set up plants in close proximity to chain of suppliers' location to ensure several pick-ups each day rather than holding on to bulks. ERP and other sources of electronic data interchange between supplier and Dream Homes will act as backbone in supporting the JIT activity. In this environment, Dream House will also be able to reduce the lead time to deliver the ordered products from 4 weeks to around 2.5 weeks by streamlining the flow of information in entire supply chain.

For the products purchased from its suppliers, it is recommended that Dream Homes should employ vendor managed inventory technique. Under this, rather than firm controlling the inventory management system, it is the suppliers who manage it. This is implemented by allowing the suppliers of the firm to access the inventory information from all locations i.e., warehouse, retail stores and distribution centers. They access the inventory data and then decide accordingly on sending/ replenishing the inventories. For example, using the point of sales technology, data from stores can flow to centralized database showing units sold and units in the stores, that can be accessed by suppliers to anticipate demand and refill requirement in each store. Similarly, to manage the inventory at warehouse, RFID (radio frequency identification) technique can be used to pick up, process and ship the order. For an inbound shipment too, this technology can easily scan the product information in seconds, leaving no room for human intervention. The access of this real time data can be allowed to vendor, to manage Dream Homes' inventory.

In a nutshell, the onus and cost of inventory management passes on to the suppliers, thereby underpinning the cost leadership strategy of Dream Homes. Low cost of inventory management will consequently reduce the overall cost of inventory and thus help, in achieving set cost targets.

- (iii) The supply chain management system of Dream Homes can be designed in the following manner:
- a. As already known, E Commerce firms works on low inventories relative to physical stores, therefore Dream Homes is pondering about changing its inventory management technique. So, it is time for the firm to focus on building strong collaborations with suppliers so that the lead time of orders placed by Dream Homes can be kept at minimum. Quality of the product offered by such suppliers also cannot be overlooked anymore since E Sellers not only make speedy shipments but also guarantee hassle free returns of the delivered product if their products fail to meet the specifications given in their website. Strong tie up with suppliers will assist the firm in meeting the ever-changing demand of its customers in this technological landscape.
 - b. Moreover, by implementing vendor managed inventory, as an effective SCM tool, much of the onus of inventory management for its purchased products will shift onto suppliers.
 - c. For the in-house manufactured products, Dream Homes needs to ensure that there is pool of dedicated suppliers in the country who can supply expected materials on a timely basis. Further, in the areas where there is dearth of such suppliers, it will have to arrange transportation of the finished goods. To keep the overall cost of product low, it should

abide by the cost per touch inventory system (successfully employed by the prominent furniture brand IKEA. It relies on the concept of passing the cost savings to its customers by putting up their products together in easy to assemble packaging enabling their customers themselves to select and pick up the product from the store. In a nutshell, less the products get touched in shipping and subsequent storage process less will be the overall cost of product).

- d. Most E Retailers maintain number of distribution centers close to their customer locations such that the outbound logistics process works in a seamless fashion and customers end up receiving their packages on the promised dates. For this to happen, Dream Homes should be ready to make large capital investments in setting up distribution centers in the densely populated parts of Indian cities.
- e. For the picking process of the goods in line with the order, it can make use of multi-faceted robotics technology with some human participation. This technology can assist human pickers in locating the required goods faster and with minimal error, thereby speeding up the entire flow.
- f. In the marketing section of supply chain, Dream Homes should use skillful data scientists to pull overwhelming data based on customer searches which can be analyzed to recommend products most useful to them. Further it could resort to TV advertisements, public banners and other prominent modes to propagate the digitization of its business.

Case Scenario 10 – Concept of cost Quality/ JIT

Dewar Bikes (DB) is large national bike manufacturing company established in the year 2003. The company has a strong position in the market and has also traditionally achieved a good market share however facing tough competition. The Board of DB recognises that it needs to make fundamental changes to its production approach in order to combat increased competition from foreign manufacturers. DB is now being seen as non-lucrative, pollutive and with less safety features in comparison to the foreign bikes. The Board plans to address this by improving the quality of its bikes as well as financial performance.

The components are sourced directly by DB. Suppliers are located worldwide. Suppliers are evaluated on an ongoing basis, including an assessment of whether to utilise new or alternative suppliers to improve capacity and performance. The company is having lot of components piled up in stock and few of them are becoming obsolete. There is lots of reworking as both internal and external failure are more, so the wastage of resources in reworking needs to be controlled. The Board is convinced that Lean Manufacturing is the best approach to be adopted.

In DB, production process is grouped by function and production teams comprised a number of permanent members, who had acquired their positions through seniority and a few newly selected specialist staff who had yet to discuss their position in any team.

The process of making a bike can be roughly divided into stamping, welding, painting, assembly and inspections, which takes about 11-12 hours in total. The standard time to manufacture a similar bike in industry is 8-9 hours. The nature of end product demand is unstable due to economic factors. However, DB forecasts demand based on its internal policies and historical trends. DB sells its bikes in

retail stores located in over 10 metro cities. It focuses on building close relationships with retailers, working with them to sell its bikes in a compelling manner.

Enclosed Annexure

Required

You are newly appointed to Management Accounting Department of DB, Chief Management Accountant asked you to draft a report for CEO, containing–

- (i) ANALYSIS of quality costs and ADVISE on two measures to reduce the non- conformance cost,
- (ii) ADVISE on implementation of just-in-time purchasing and production.

Annexure

Statement Showing 'Total Quality Costs'

Particulars of Costs	Rs.
Prevention Costs	
Supplier Review	2,50,000
Appraisal Costs	
Equipment Testing ($36 \times 1,600$ hrs.)	57,600
Internal Failure Costs	
Down Time	15,40,000
Manufacturing Rework ($456 \times 3,200$ bikes)	14,59,200
External Failure Costs	
Customer Complaints ($70 \times 2,000$ hrs.)	1,40,000
Warranty Repair ($3,120 \times 2,600$ bikes)	81,12,000
Total Quality Costs	1,15,58,800

Solution

Report

Addressed to:

Office of CEO,

Dewar Bikes

Dated –06th May 2020

Analysis of Quality Costs

The reporting of quality costs highlights the cost of quality activities at DB. The total quality costs statement clearly displays the relationship between conformance costs (prevention and appraisal costs) and non-conformance costs (internal failure and external failure costs) and the drivers of a reduction in the overall spending on quality. Statement indicates that only 2.16% of the total quality cost is the cost of preventing quality problems while 0.50% is the cost of appraisal activities. Thus, prevention and appraisal costs make up only 2.66% of total quality costs. In contrast, 97.34% of quality control costs are incurred for internal and external failure costs.

Two measures to reduce nonconformance cost

Total Productive Maintenance (TPM) is a system of maintaining and improving the integrity of production and quality system through keeping all equipment in top working condition so as to avoid breakdowns and delays in manufacturing processes. It involves identifying machines in every division (including planning, manufacturing, maintenance) and then planning & executing a maintenance programme covering their entire useful life.

In this case, TPM will help in reducing internal failure cost (i.e., downtime and manufacturing rework cost), which constitutes 25.95% of total quality cost, by keeping all equipment in good working conditions so that there is no downtime or machine breakdown and ensuring that all equipment run smoothly. If machines work properly, the chances of rework will reduce, ultimately will also reduce chances of warranty repair and customer complaints (comprising 71.39% of total quality cost which is a major part of total quality cost).

Total Quality Management (TQM) aims at improving the quality of organisational output, including goods and services, through continual improvement of internal practices. Its objective is to eradicate waste and increase efficiency without compromising with the quality. It requires maintaining quality standards in all aspects of business by ensuring that things are done right the first time so that defects and waste are eliminated from operations.

It appears that DB is not a TQM company at present, due to huge disparity between conformance costs and non-conformance costs. In order to make DB to be successful, all staff at DB must be engaged in the improvement process and share in the continuous improvement ethos. In order to establish a reputation as a high- quality bike manufacturer DB must ensure, staff is having attitude towards the importance of conformance activities, for instance, DB can conduct third party inspection of components at supplier's workplace leading to maintenances of quality standards.

Overall, while applying above two measures, in the DB, consideration must therefore be given to the optimum balance between the costs of conformance and the costs of non-conformance.

Implementation of Just in Time

Just in time purchasing and production technique will put an end to the harrowing task of inventory management. In this form of pull system, purchasing of components and production of bikes will be based on customer demands and DB will have to accordingly coordinate with its suppliers to supply the right quantity of components required at the right time. JIT inventory management calls for having the inventory as and when needed also taking care of massive holding cost suffered related to large build ups. In this environment, DB will also be able to reduce the manufacturing time around 3 hours by streamlining the flow of information in entire supply chain.

Dewar is assessing alternative suppliers on continuous basis to improve capacity and performance. It means it is changing sources of material regularly or using multi-suppliers. In contrast, JIT is based on reduced number of supplier and move towards single sourcing. It is easier to develop long term cooperative relationships with a smaller number of suppliers. The quality of internal services and an organisation's ability to provide quality products or services to its customers depends upon this relationship. However, this relationship is obviously missing in DB.

DB has close relationship with the retailers but relationship with suppliers is equally important.

It appears that firm is also importing its requirements from abroad. In JIT environment, it is important that suppliers are, to the extent practical, located in close proximity to the manufacturing plant. Carefully selected suppliers are capable of delivering high quality materials in a timely manner, directly at the shopfloor, reducing the material receipt time. Therefore, selection of right supplier located in close proximity to the manufacturing plant is vital for the proper implementation of JIT.

It is also important to note that every supplier is different, but the DB has to be able to view each as one of its part only. The supplier's network must be able to call up and communicate directly with the DB's network, obtaining manufacturing schedules and product specification in real time. ERP and other sources of electronic data interchange between supplier and DB will act as backbone in supporting the JIT activity.

On the whole, DB's management has to treat suppliers as partners with significant influence on the success of the organization.

The functional division is less appropriate in JIT environment. JIT production requires multi- skilled teams. In DB, teams need to be formed to work by product i.e., type of bike rather than by the type of work performed. In addition, staff will need training to work in the new teams, measures surrounding the amount and effectiveness of training will be required. A JIT system works best when employees pitch in with suggestions for improvements. The performance can be measured by computing 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.

DB forecasts demand based on its internal policies and historical trends. Today demand in every sector of the market changes by leaps and bounds, so using historical data is not at all recommended. Demand forecasts should be pulled by current market trends and prediction of future market sentiments. However, in case of DB, demand is unstable. In this case, in order to prevent stock-outs, inventory managers can only increase the Kanban numbers of each product; the greater are the variations, the greater is the need of Kanban cards and, thus, the higher is stock level and need more working capital per rupee of sales.

Conclusion

The Board desires to improve the quality as well as financial position which can be achieved through successfully implementation of quality control and lean system. However, the factors discussed above should be taken care of. It is worthwhile to note that any return on investment in proposed system must be viewed long term rather than short term since optimum results may not be realized until the system has been in place for some time.

Further details can be tabled on requisition basis.

Closure of Report

Chief Management Accountant

(For Management Accounting Department)

Dewar Bikes

Case Scenario 15 – Life Cycle Costing (RTP Nov'21)

Cellwell Technologies Ltd. is a manufacturer of mobile phones. It has been an established player in the market having launched various cell phone models in the last 10 years. With the preference for usage of cell phones increasing, the company has grown rapidly since inception. During the last two years, sales have been increasing but at a slower rate. Competition has increased and hence sales growth has been slowing down.

Cellwell Technologies plans to introduce a new smart phone model called XXX21. The company's research and development team has come up an additional feature for this cell phone model. This feature will periodically inform the customer using the cell phone regarding any software update required for the model. By installing these updates many existing bugs in the software model and security issues to the software can be fixed. This process can be executed remotely with the help of the new technology that the research and development team has developed. This improves the cell phone performance and keeps it running smoothly. It improves compatibility of the software with that used in other applications and devices. It also enhances customer experience as the software update will bring out new software features (like newest emotions / updated dictionary) that can be used by the customer. Consequently, the general utility of the cell phone life will improve by almost a year. There will be less complaints due to performance / compatibility related issues.

The business development team has come up with a proposal for sales promotion. As per this proposal, customers can trade in older model of their cell phone in order to buy the latest XXX21 model. Due to the trade, customers can buy the latest model XXX21 at a substantial discount.

After discussion with the research and development team, they conclude that this would have an additional advantage. Cellwell Technologies can refurbish (repair and renovate) these older models and resell them in the market at a substantially lower price. Typically, students or customers in the lower income groups who look for cheaper models may find this offer interesting. This creates a new market space for the company to target.

Those older cell phones traded in, that cannot be refurbished or are beyond repair / use can be recycled. Various parts of these phones can be recycled and fitted into the new cell phone models that are being made. Any cell phone model contains various precious metals like gold, copper, platinum as also rare earth elements like neodymium, terbium to name a few. These are difficult to obtain and need to be mined out of the earth causing huge damage to the environment. With the demand for cell phone slated to increase, the need for these materials is going to increase as well. Therefore, if these materials can be extracted from old cell phones that would otherwise have been disposed-off into a landfill, it would benefit the environment while providing an alternate source of material procurement. Since billions of cell phones are used globally, every small measure makes an impact. With increasing awareness about environment hazards, such a proposal is likely to find support among customers. It is also helpful to improve the company's brand image.

Both proposals to introduce software upgrade feature in the cell phone as well as the trade in sales promotional offer are unique as no other competitor has such features in their products or have made such offers yet.

Required

- i. IDENTIFY the lifecycle phase of Cellwell Technologies Ltd. JUSTIFY your response with reference to the case facts.
- ii. DISCUSS the impact of the decision to allow trade in of the company's older cell phone models on the product lifecycle of such phone models.

Solution

- i. Cellwell Technologies Ltd. is in the "Maturity" stage of product lifecycle. It has been an established player in the cell phone market. The company has seen rapid sales growth. Over the last 2 years sales have been increasing at a slower rate due to increased competition. Therefore, the company has decided to introduce a new product model in the form of XXX21.

Retention of existing customers and trying to win over the competitor's customers is the strategy being used by Cellwell Technologies. The XXX21 model that enables customers to upgrade the software of their smartphone enhances its product features. This differentiates the company's product with that of its competitors. Technology changes at a fast pace. By enabling customers to upgrade their mobiles would definitely improve performance, lower customer complaints due to breakdown or compatibility issues due to older software. Improved performance along with longer product life would definitely enhance customer satisfaction as well as attract newer customers. The add on benefit is that the execution of this update can be managed from remote locations without the need for in person assistance.

The offer to trade in old cell phones while buying the latest XXX21 model would appeal to price sensitive customers. It will also evince interest of customers who are looking to dispose their cell phones that would otherwise end up in the landfill. The trade in offers monetary benefit in the form of a discount. This sale promotional offer to trade old phones for a discount in the price of the latest model XXX21 would definitely help Cellwell Technologies to effectively compete with its competitors.

Cellwell Technologies would have the first mover advantage by implementing both the product enhancing / differentiating feature in model XXX21 as well as the trade in options to customers. This shows that the management has a clear plan on how to effectively beat the competition. This indicates that the company is now in the "Maturity" stage of product lifecycle.

- ii. Cellwell Technologies has introduced a sales feature to allow trade in of older cell phone models in exchange for model XXX21 at a substantial discount. These phones would then be used in 2 ways (1) by refurbishing (repairing and renovating) or (2) recycling useful product parts and extracting precious metals and earth elements from the phones.

The refurbished phones would be sold at a substantially lower price to customers like students or lower income groups. Thus, the older cell phone model gets a new lease of product life after the requisite repairs. This extends its product life cycle by a further time frame until there may be no use of the cell phone model at all.

In the case of phones that are of no use/ completely dead, usable parts are being recycled into existing products. Thus, this becomes an alternate source of material procurement for the company at a much lower cost. Consistent use of this measure would definitely reduce the cost of production by a certain margin. The product lifecycle of such cell phones (dead phones) is not being extended. However, they continue to provide value to the company with the help of the recycling process. The intangible benefit of this measure would be the positive impact that recycling would have on the environment. A move that would definitely enhance the company's brand image.

Skill Based – Q14 – Pricing & Cost Reduction

Venice Light Works (VLW) manufactures multicolour glow bulb (MCG-10) used for lighting and decoration. MCG-10 considered as reliable product in market due to zero-defect. VLW sells MCG-10 through retail-chains and individual shopkeeper apart from factory outlet. MCG-10 has demand throughout the year but there is high demand during festival seasons especially ahead of Diwali. Company follows the lot purchase system and manufacture the product ahead of peak season of festivals. Presently the VLW is working at 80% of capacity and manufacture 4,00,000 bulbs annually, at following per unit cost:

Particulars	Behaviour	Amount (In)
Direct Material	Variable	22
Direct Labour	Variable	6
Factory Overhead		
1. Engineering Cost	Fixed	10
2. Machining Cost	Fixed	5
3. Inspection Cost	Variable	5
Administration Overheads	Fixed	12
Selling and Distribution Overheads	Fixed	12
Total Cost		72

Recently the competition in decorative lights & electronic markets has escalated, due to goods imported from Chinese manufactures at cheap rates. Such imported light bulbs are also sold through same shops at which MCG-10 is available for sale. Due cheaper in rate customer prefer imported light bulb rather MCG-10.

To be competitive in market, the marketing department of VLW conducted applied research and suggested that price should be 12.5% lower than the current prices. VLW during last three financial years and during current year records the pre-tax profit @ 10% rate of sale, management of VLW wish to earn the same rate of profit (margin) in upcoming years too.

Production and operation manger is of opinion that cost reduction, in order to be competitive in market may result in reduction in quality, whereas Manger - Quality control suggest, if number of inspection staff increased, then inspection can be performed at each stage and defect can be curtailed at the earliest stage to eliminate rework cost.

Management accountant is of opinion that since MCG-10 is mature product, hence majority of cost associated in production of MCG-10 are committed in nature, price cutting seems difficult; it may hit the top line and bottom line adversely. In response to him, Chief engineer suggest product (MCG-10) can be redesigned; but marketing manager shown his resistance on the suggestion of redesigning of

product because according to him 'existing product appearance and features are key reasons for popularity of product in market and leads to sale'.

Required

- i. CALCULATE the price suggested by marketing department.
- ii. COMPUTE the target cost and new margin, appraise percentage decline in margin.
- iii. If proportionate cost reduction plan is applied, then
 - a. CALCULATE planned cost reduction for each cost category.
 - b. EXPLAIN proportionate cost reduction plan.
- iv. Based upon discussion taken place among the functional manger, EVALUATE the possibility of cost reduction in order to analyse the possibility of application of target costing. Also suggest course of action to adopt.

Solution

(i) Price suggested by marketing department (Target Price)

Current cost per unit – 72 per unit

Profit (Margin) @10% of sale price

Sale Price = 72 + 10% of Sale Price

So, let presume sale price is 'x'

$$X = 72 + 10\% \text{ of } X$$

$$X = 72 + 0.1X$$

$$X - 0.1X = 72$$

$$0.9X = 72$$

$$X = 72 / 0.9$$

$$X = 80$$

New price will be 12.5% less than current price 80 – 12.5% of 80

$$80 - 10 = 70$$

(ii) Target cost and new margin

Target Price – Margin (i.e. 10% of sale price) = Target Cost

Target Cost = 70 – 10% of 70

$$= 70 - 7 = 63$$

New Margin (under target costing) is 7

Percentage decline in margin

= Existing Margin – New Margin (under target costing) / Existing Margin

$$= 8 - 7 / 8 * 100$$

$$= 12.5\%$$

Note

There is decline in margin in absolute term, whereas in relative term the margin remains same i.e., 10% of sale price.

Particulars	Existing Cost	Target Cost
Direct Material	22	19.25
Direct Labour	6	5.25
Factory Overhead		
1. Engineering Cost	10	8.75
2. Machining Cost	5	4.375
3. Inspection Cost	5	4.375
Administration Overheads	12	10.5
Selling and Distribution Overheads	12	10.5
Total Cost	72	63

(iii) Planned cost reduction for each cost category under proportionate reduction plan

Under proportionate reduction plan cost for each category is proportionately reduced in proportion of existing weight. Here, a presumption is needed to be taken that all the cost are avoidable in nature, where as in case of every business; there are some of cost categories which are true sense unavoidable and committed in such a way that, these continue to occur even in shut down situation (e.g. salary to guard, minimum rental for electricity and water meter etc.); same is pointed by Management Accountant, that product is matured in nature (means not in designing or research phase) hence committed cost may be unavoidable in nature.

Note

Student must note that fixed costs are not as same as unavoidable cost. Fixed cost may be avoidable in nature.

(iv) Possibility of cost reduction & Suggested course of action for VLW

Target costing comprises four stages. First being determining the product target price, quality, and functionality; second determine the target cost; thirdly designing the product and production process to achieve the target costing, and fourth use pilot project to evaluated feasibility. Based upon discussion taken place among the functional managers, it is evidential that VLW is presently moving towards third stage.

As stated by management accountant that product MCG-10 is mature nature hence majority of cost are of committed nature, hence may be unavoidable in nature. Product MCG-10 is material-oriented product and raw material cost is around 30% of total cost. So, if gain sharing arrangement can be entered with vendor then surely VLW can save some portion of material cost.

As said by production and operation manager, cost reduction may lead to compromise with quality. He may be right, but he needs to look for scientific way to reduce the cost of operations like change in batch size (if required can shift to JIT) or outsource some part of operations; scientific management can also be applied in order to curtail motion time and reduction in labour cost.

Quality Manager is of opinion with extra inspection staff, quality can be assured, but appointment of additional inspector and supervisor will also lead to increase in cost; hence effective way to

ensure quality while reducing cost of application of practice of TQM and Kaizen. Kaizen costing will be great help to management of VLW to cut the cost, with support and participation from worker.

Chief engineer suggestion is appreciable, because target costing is most beneficial in those case where the product is in designing and planning phase. As per research around 70-80% of cost is committed at stage of designing of product. It is important to note that the word 'committed' is used as 'not incurred'; therefore, cost being committed (i.e., not incurred cost) will be incurred when it became due in course of production. But redesigning is not feasible from the prospects of marketing of product as per the statement made by marketing manager.

Marketing manager can conduct applied research in order to develop understanding the temperament of customer of MCG-10, whether they are price sensitive or conformance to need is their priority. If customer found price sensitive (existing recommendation of marketing team shows high possibility of this, because marketing team feels customers can be retained is price is reduced by 12.5%) then product redesign may be opted. But if conformance to need is their (customers) priority, then value chain analysis can be used to identify the activities which creates value to customer and other than these activities (which are not creating the value) can be eliminated in order to reduce the cost.

So, there are possibility to reduce the cost, even if not in all the cost category then surely in some of categories; so that target cost can be achieved.

Skill Based – Q16 – Life Cycle Costing

Royal Bakers is famous for cakes and cookies. Mr. Das the owner at Royal Bakers is interested in offering affordable products to their customers, hence keen to capture the small scope of cost-effectiveness. Royal Bakers located in the centre of the city where space has a huge cost and royal baker is running out of space during peak hour causing loss of sale. Most of the customer are regular to Royal Bakers. Royal Baker is known for fast service, Mr. Das wish to be true to the tagline 'Close your eyes to wish and open them to find it cooked for you'. The hurdle rate is 12%.

Non-availability of skilled worker and high attrition rate of worker including chef is the cause of worry for Mr. Das. In order to retain worker, Royal Baker is paying a higher salary than industry standards. The raw material is easily available as and when it is required. Royal Bakers is considering two different models of baking oven machine to replace its old oven. The baking capacity of both machines are the same and both will occupy a similar amount of space.

The first model is the automatic oven which will cost about Rs. 10,00,000. Another model is the semi-automatic oven which will cost at Rs. 5,60,000. The annual operating cost (including depreciation) is 40% of the acquisition cost and Rs. 4,20,000 in case of automatic and semi-automatic oven respectively. After 3 years of use, the automatic oven can be salvage at 70,000, whereas semi-automatic oven will fetch 20,000 only. The automatic oven is more advanced and equipped with latest technologies to speed up the baking, because only ingredients need to be inserted in right proportion and mix. Whereas in semi-automatic machine some part of the process needs to be performed manually by the workers.

Required

ADVISE which oven shall royal baker acquire.

Note- You can ignore taxes but need to consider the time value of money; decimal accuracy up-to two digits is expected.

Solution**Statement of the Comparable Life Cycle Cost**

Particulars	Automatic	Semi-Automatic
Acquisition Cost	10,00,000	5,60,000
PV of Entire Life Cash Operating Cost (W.N.2)	2,16,000	5,76,000
PV of Salvage Value (W.N.3)	(49,700)	(14,200)
Total Cost of the Oven over the life cycle	11,66,300	11,21,800

Note – Hurdle rate of 12% (marginal cost of capital rate) is considered, for purpose of application of time value of money.

Working Note 1 – Depreciation

Particulars	Automatic	Semi-Automatic
Acquisition Cost	10,00,000	5,60,000
Salvage Value	70,000	20,000
Depreciable Value	9,30,000	5,40,000
Useful life in a number of years	3	3
Depreciation on SLM basis	3,10,000	1,80,000

Working Note 2 – Present Value of Entire Life Cash Operating Cost

Particulars	Automatic	Semi-Automatic
Annual Operating Cost	4,00,000	4,20,000
Depreciation (see W.N. 1)	3,10,000	1,80,000
Annual Cash Operating Cost	90,000	2,40,000
Cumulative PV factor @ 12% for 3 years	2.40	2.40
PV of Entire Life Cash Operating Cost	2,16,000	5,76,000

*Annual operating cost is 4,00,000 i.e., 40% of 10 Lakhs, in case of automatic machine.

Working Note 3 – Present Value of salvage value

Particulars	Automatic	Semi-Automatic
Salvage Value	70,000	20,000
PV Factor @ 12% for 3rd year	0.71	0.71
PV of Salvage Value	49,700	14,200

Advise

Based upon life cycle cost, Royal Bakers are advised to acquire semi-automatic oven, because it causes a saving of 44,500. The cost has qualitative implications too, apart from quantitative or monetary implications. Similarly, a management decision is also impacted by qualitative and non-

monetary quantitative factors. Hence, decision taken in part a above may differ if Royal Bakers consider-

Finishing of bake products – the look and taste

It is obvious the presence, which one important feature for bakery product in order look delicious and tempting; will be way different if cooked in the automatic and semi-automatic machine. The taste may also be different, which is more critical from prospective of customer retention because a large number of the customers are regular to the royal baker, hence maintaining the principal customer is maybe a key consideration. This factor may go in favour of any of version oven. If look goes in favour of automatic oven, then taste may be in semi- automatic due to corrections by the worker during baking and relatively authentic preparation.

Manpower

Availability of skilled worker and retention of worker is the cause of worry presently. In order to operate an automatic oven obviously fewer workers are required; hence money can be saved by cutting down recruitment cost and excess salary paid to the worker in order to retain them. On another hand, skilled workers are already in scarcity, automatic machine obviously requires a more technically competent operator. But largely this factor moves in favour of automatic machine despite is costlier.

Space

Royal Bakers located in the centre of the city where space has a huge cost and royal baker is running out of space during peak hour causing loss of sale. Although the size of both the ovens are same, the number of worker and space required for them surely be less in case of the automatic oven. Hence this factor again moves in favour of automatic oven.

Power consumption & availability

Although the power consumption cost is presumed to already include in annual operating cost hence considered as a monetary factor but need and availability of power is a very important factor; in order to ensure uninterrupted baking. In absence of stand-by power back-up, power cut may lead to downtime. It will complete downtime for the automatic oven and to a certain extent in the case of semi-automatic (because the manual process will keep going on). Stand- by power back-up will also have an additional cost.

Customisation

In case of cookies, it may ok to produce the standard product; but the cake needs to base upon the order of the customer, who may seek customisation. Scope of customisation needs to evaluate. In the case of the semi-automatic oven, the scope of customisation and ethnicity will be relatively high.

Speed

Royal Baker is known for fast service, and Mr. Das wish to be true to tagline 'Close your eyes to wish and open them to find it cooked for you'. The automatic oven is more advanced and equipped with latest technologies to speed up the production. Hence this factor moves in favour of automatic oven.

Detection of the defect

If speed thrills, then it kills too. In case of the bakery, rework and reprocessing is hardly possible, even if possible then at a huge cost; hence it is essential to keep vigil control over quality and detection of

defect at the earliest stage. In the semi-automatic oven, there is the scope of reviewing the material after stage/s and improvisation can be done.

Overall, Royal Bakers should take the decision only after due and careful consideration of above factors.

Skill Based – Q23 – Target Costing

NEC Ltd. forms a Committee consisting of its Production, Marketing, and Finance Directors to prepare a budget for the next year. The Committee submits a draft budget as detailed below:

Particulars	Rs.
Selling Price per unit	50
Less: Direct Material Cost per unit	9
Direct Labour Cost per unit	9
Variable Overhead per unit (3 hrs. @ Rs. 2)	6
Contribution per unit	26
Budgeted Sales Quantity	25,000 units
Budgeted Contribution (25,000 × Rs. 26)	6,50,000
Less: Budgeted Fixed Cost	5,00,000
Budgeted Profit	1,50,000

The Management is not happy with the budgeted profit as it is almost equal to the previous year's profit. Therefore, it asks the Committee to prepare a budget to earn at least a profit of ` 3,00,000. To achieve the target profit, the Committee reports back with the following suggestions:

The unit selling price should be raised to Rs 55.

The sales volume should be increased by 5,000 units.

To attain the above said increase in sales, the company should spend ` 40,000 for advertising.

The production time per unit should be reduced.

To win the acceptance of the workers in this regard the hourly rate should be increased by ` 3 besides an annual group bonus of Rs. 30,000.

There is no change in the amount and rates of other expenses. The company has sufficient production capacity.

As the implementation of the above proposal needs the acceptance of the work force to increase the speed of work and to reduce the production time per unit, the Board wants to know the extent of reduction in per unit production time.

Required

- (i) CALCULATE the target production time per unit and the time to be reduced per unit.
- (ii) IDENTIFY the other problems that may arise in production due to decrease in unit production time and also suggest the remedial measures to be taken.
- (iii) STATE the most suitable situation for the adoption of Target Costing.

Solution

(i) Target Production Time per unit

$$(\text{Rs } 3 + \text{Rs } 3 + \text{Rs } 2) \times \text{hrs.} \times 30,000 \text{ units} = \text{Rs } 5,10,000$$

$$\text{Hrs.} = 2.125$$

$$\text{Time to be reduced per unit} = 3 \text{ hrs.} - 2.125 \text{ hrs.}$$

$$= 0.875 \text{ hrs.}$$

Workings**Statement Showing Target Cost (Direct Labour and Variable Overhead)**

Particulars	Amount (Rs.)
Target Sales ($55 \times 30,000$ units)	16,50,000
Less: Target Profit	3,00,000
Less: Direct Material Cost ($9 \times 30,000$ units)	2,70,000
Less: Budgeted Fixed Costs	5,00,000
Less: Proposed Advertising	40,000
Less: Proposed Annual Group Bonus	30,000
Target Cost (Variable Overhead and Direct Labour) for 30,000 units	5,10,000

(ii) Problem

The target-costing method is applicable particularly for repetitive manufacturing. It should however be recognised that some products often bear a high degree of repetition and that there often are considerable repetitions where reduction targets could come into play as a framework for improving design. Working under pressure to finish new design assignments in a short time may take development resources away from efforts to optimise or re-engineer production processes. If approaching product design as an activity to be optimised independently there is a risk that target costing may not succeed to satisfactorily addressing overall performance, so in short decrease in unit production time may lead to unwanted pressure on design and its implementation stage.

Remedial Measures

As a remedial action organisation should retain strong control over the design teams headed by 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. If the time is too short even an organisation may reject a project for the time being. Later, it can be tried out with new cost reduction methods or less expensive materials to achieve target cost and control overall production activities.

(iii) 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.

Skill Based – Q27 – Target Costing – Nov'20

NEC Furniture Ltd. is a leading manufacturer and supplier of furniture for students of pre-primary classes. The full cost of one set (comprising one Table and one chair) is Rs. 900 per set. The company has fixed its selling price so as to earn 30% return on investment of Rs. 45,00,000. The company produces and sells 6,000 sets per annum. Relevant cost data per annum are as follows:

Cost Component	Budget	Actual	Actual Cost p.a. (Rs.)
Direct Material	90,000 sq. ft.	1,00,000 sq. ft.	16,50,000
Direct Labour	35,000 hrs.	40,000 hrs.	10,32,000
Mechanical Assembly	60,000 hrs.	60,000 hrs.	12,00,000
Machine Setup	5,000 hrs.	5,000 hrs.	1,68,000

It has been revealed that the actual and budgeted operating levels are the same, Actual and standard rates of material purchase and labour rate per hour are also the same. Any variance in cost is solely on account of difference in the material usage and hours required to complete the production. A competitor has introduced a product very similar to product of the company at an aggressive price of Rs. 820 per set which has resulted in downtrend in the sales volume the company. The management has called urgent meeting of the marketing team. After the meeting, following recommendations of the marketing team are approved by the management:

- (a) To maintain the company's existing sales volume and amount of present return on investment, reduce the selling price by 10%.
- (b) To make slight improvement in design to have edge over the competitors which will also reduce the direct material cost by Rs. 30 per set.
- (c) To make the table and chair more attractive, print picture of Disney character on them, which will cost Rs. 5 per set.

Required

- (i) CALCULATE the present selling price and profit per unit from the above. Also CALCULATE the mark-up % on the full cost per unit.
- (ii) IDENTIFY the non-value-added activities in the production process.
- (iii) (a) CALCULATE the new target cost per unit and new revised cost per unit after implementation of above recommendations.
 - (b) How much reduction in cost is required to achieve the new target cost?
- (iv) RECOMMEND what strategy the company should adopt to attain the target cost calculated above.

Solution

(i) Present selling price per unit (set) is ₹1,125 i.e. ₹900 (full cost per set) + ₹225 (desired return per set - refer working note below)

Profit per unit (set) is ₹225 (refer working note below)

Mark-up = (Profit per set / Full cost per set) × 100 i.e. (₹225/ ₹900) × 100 = 25% or 225/1,125 = 20%

Working Note –

Desired Return per set (30% of ₹45,00,000) / 6,000 sets

13,50,000 / 6,000 sets = ₹225 per set

(ii) Machine setup is the time required to get the machines and the assembly line ready for production. NEC furniture limited spent 5,000 hours on setting up, which does not add value to the furniture set directly. Hence, it is a non-value add activity.

(iii) (a) New Target Cost per unit (set)

Particular	Amount in ₹
Target Price (1,125 – 10% of 1,125)	1,012.50
Less: Desired Return per set	225.00
Target Cost per unit (set)	787.50

Revised Cost per unit (set)

Particular	Amount in ₹
Present cost per unit (set)	900.00
Less: Reduction in material cost	(30.00)
Add: Incremental Cost to print picture	5.00
Revised Cost per unit (set)	875.00

(b) Cost Reduction Target

Particular	Amount in ₹
Revised Cost per unit (set)	875.00
Less: Target Cost per unit (set)	787.50
Cost Reduction Target per unit (set)	87.50

(iv) As calculated above, revised cost per unit (set) is ₹875.00 while the target cost per unit is ₹787.50. Hence, the cost has to be reduced at least by ₹87.50 per unit. Critical aspects at which NEC furniture limited shall focus—wastage in term of productivity i.e. usage of material and efficiency in labour; design of product in term of quality and function it renders, and material or components used as input; design of processes including lay-out through which product will be manufactured i.e. machine set-up and mechanical assembly. Value analysis / value engineering shall be applied (by answering following questions) to focus on the above stated aspects in order to attain the target cost—

- Can the product be designed better to make the production more efficient?
- Is reduction of design (reduce features only, not functions) possible?
- Can the design be minimized to include fewer parts and thus make it easier and efficient to manufacture?
- Can any process eliminate or reduced?
- Can be substitute parts to make it more efficient? Or
- Is there simply a better way of producing the same product?

It is important to note that target costing is a dynamic and corrective approach, care must be taken for product quality, characteristics, and utility.

Analysis of the cost data shows the variances between the budget and actual material usage and labour hours. It is given that the material procurement rate and labour hour rate is the same for budgets and actuals. Hence, the increment in cost of direct materials and labour is due to inefficient use of material and labour hours to complete the same level of production of 6,000 sets of furniture.

Corrective actions to address these inefficiencies could result in the following savings:

- Inefficiencies resulted in use of extra 10,000 sq. ft. of material.

Material cost per sq. ft. = Actual cost (revised)/ Actual material usage = (₹16,50,000 -

₹30 × 6,000) / 1,00,000 sq. ft. = ₹14.7 per sq. ft.

Therefore, inefficiencies resulted in extra cost = 10,000 sq. ft. × ₹14.7 per sq. ft. = ₹1,47,000.

If corrective action is taken, for 6,000 sets of furniture this translates to a saving of ₹24.50 per unit.

- Inefficiencies resulted in extra 5,000 hours to be spent in production.

Labour cost per hr. = Actual cost / Actual labour hrs. = ₹10,32,000 / 40,000 hrs. = ₹25.8 per hr.

Therefore, inefficiencies resulted in extra cost = 5,000 hrs. × ₹25.8 per hour = ₹1,29,000.

If corrective action is taken, for 6,000 sets of furniture this translates to a saving of ₹21.5 per unit.

- Machine setup cost is a non-value-added cost. Value analysis can be done to determine if the setup time of 5,000 hours/₹1,68,000/- can be reduced. However, since these activities have been carried out for a reason, care should be taken to ensure that this change should not adversely impact the production activity later down the stream.
- Mechanical assembly cost are costs incurred during the production process on the assembly line. Value analysis can be done to determine if the production process can be made more efficient. For example, the process can be streamlined, such that steps can be combined that can be handled by fewer people (process centring).

Skill Based Question 33 – Environmental Management A/c

Sheetal Paper Mart (SPM) is in process of getting ISO 14001:2004 Environmental Management Systems (revised ISO 14001:2015) certification. SPM is selling eco-friendly and wheat straw-based paper of different sizes (A3, A4, and A5) and GSM under the brand 'Prime'. Prime is a famous name among both commercial and household consumers.

For purpose of getting certified, a cross-functional team is constituted, which is responsible 'to improve the environmental impact & image of SPM as eco-friendly enterprise and control environmental cost', which collects the following particulars relating to the H1 and H2 (first and second half of the relevant fiscal year respectively)

Disposing of the toxic material costs ₹1.2 crores to SPM in H2 which is 20% lesser than what was spent during H1. Committee responsible for formulating policy matters on environment-related aspects in SPM has departmental budget of ₹6 lakhs p.a., in H1 the utilisation rate was 80% and in H2 it was 110%.

Environmental audits earlier used to conduct on a half-yearly basis, but management decided to reduce the frequency to quarter each, in the mid of such year. Each such audit cost ₹8 lakhs to SPM. In the H2 SPM extends the production capacity and installed the new plant & machinery which has put to use cost of ₹77.25 crores, this is the premium version of the plant and machine due to its capability to reduce the generation of waste. Erection and other installation costs including dry-run were ₹65 lakhs and the same for all versions. The standard version has on-board cost of ₹76.20 crores.

SPM is practicing the recycling policy, which was formulated around three years ago; for the scrap, it generates in its plant. The review of the recycling policy is pending for the last 12 months. The cost incurred during the fiscal year was ₹2.75 crores, spent in alignment to scrap generated during the year. The policy document also states– ‘zero discharge of waste/scrap into the environment, in order to be true-sense eco-friendly enterprise’.

In H2 contamination test was performed which cost ₹4 lakhs to SPM. The monitoring cost incurred during the year was ₹78 lakhs; in H2 this was double then H1.

Required

- (i) PREPARE the environmental cost statement as per the classification suggested by ‘Hanson and Mendoza’.
- (ii) ANALYSE the elements of environmental cost at SPM.
- (iii) EVALUATE whether the cross-functional team is successful in serving their ‘terms of reference’.

Note- Clearly State the assumptions (if any).

Annexure

Scrap Generated (during the year)

Quarter	First	Second	Third	Fourth
Scrap generated and recycled	1,572 MT	1,428 MT	1,114 MT	886 MT

Solution

(i)

Sheetal Paper Mart

Environmental Cost Statement

Particulars	H1		H2	
	Amount (in lakhs)	% to total	Amount (in lakhs)	% to total
Environmental Prevention Costs				
Creating Environment policies [(6/2) × 0.8] [(6/2) × 1.1]	2.4	0.68	3.3	0.96
Investment in protective equipment [(7,725 – 65) – 7,620]	-	-	40#	11.58
Sub-Total (a)	2.4	0.68	43.3	12.54
Environmental Detection Costs				
Monitoring (78 in the ratio of 1:2)	26	7.40	52	15.06

Performing Contamination test	-	-	4	1.16
Environmental Audit [1 × 8] [2 × 8]	8	2.28	16	4.63
Sub-Total (b)	34	9.68	72	20.85
Environmental Internal Failure Costs				
Recycling Scrap (275 in the ratio of 3:2)	165	46.95	110	31.86
Disposing of Toxic Material	150	42.69	120	34.75
Sub-Total (c)	315	89.64	230	66.61
Grand Total (a + b + c)	351.4	100	345.3	100

Since the details regarding useful economic life of the newly erected plant and the machine is not given, hence the entire incremental cost recognised in H2 only (when put to use); despite the benefit will arise over the useful economic life in form of a reduction in generation of waste.

Concept Insight

Hansen and Mendoza in the year 1999 point out that environmental costs are incurred because of poor quality controls. They classify the environmental cost into the following four categories–

- Environmental Prevention Costs– Those costs associated with preventing adverse environmental impacts.
- Environmental Appraisal Costs– The cost of activities executed to determine whether products, process and activities are in compliance with environmental standards, policies and laws.
- Environmental Internal Failure Costs– Costs incurred from activities that have been produced but not discharged into the environment.
- Environmental External Failure Costs– Costs incurred on activities performed after discharging waste into the environment.

(ii) Analysis

The environmental cost incurred in H2 (₹345.3 lakhs) is comparatively less than what was incurred in H1 (₹351.4 lakhs). Environmental internal failure costs reduced in H2 (₹230 lakhs) in comparison to H1 (₹315 lakhs), but still a substantial component of total environmental costs (66.61% in H2 against 89.64% in H1). The reduction of environmental internal failure costs is the outcome of increased environmental prevention costs (12.54% in H2 against 0.68% in H1) and environmental detection costs (20.85% in H2 against 9.68% in H1).

Note – Since the policy document also states ‘zero discharge of waste/scrap into the environment, in order to be true-sense eco-friendly enterprise’ hence there are no environmental external failure costs.

(iii) Evaluation

Apart from getting the certificate, the cross-functional team has terms of reference ‘to improve the environmental impact & image of SPM as eco-friendly enterprise and control environmental cost’

In the context of controlling environmental cost, the team attained a reasonable reduction in total environmental cost, impact in this environmental cost statement (over H1 and H2) seem low because the incremental cost due to purchase of premium version of plant and machine is charged in H2, which will benefit in form reduced waste over the useful economic life.

In the context of improving the image of SPM as an eco-friendly enterprise, the policy document which in practice also states– ‘zero discharge of waste/scrap into the environment, in order to be true-sense eco-friendly enterprise’ and same is also visible through environmental cost statement as there are no environmental external failure costs

In the context of improving the environmental impact, SPM able to generate low waste in H2 (2,000 MT) in comparison of H1 (3,000 MT) just by installing new plant and machine which produce less waste, increased monitoring, and audits.

Hence it can be concluded that the team is successfully serving the terms of reference.

Skill Based - Q41 – Quality Costs (Student Journal)

NZ Ltd. implemented a quality improvement programme and had the following results:

Particulars	2020	2021
	(Figures in `000)	
Sales	6,000	6,000
Scrap	600	300
Rework	500	400
Production Inspection	200	240
Product Warranty	300	150
Quality Training	75	150
Materials Inspection	80	60

Required

ANALYSE the quality costs.

Solution

Analysis

The total cost of quality in the year 2020 was ₹17,55,000. The total cost of quality in the year 2021 was ₹13,00,000. Therefore, over all the cost of quality decreased by ₹4,55,000 from 2020 to 2021. Given the same scale of operations in both years (annual turnover being 60,00,000), the profits therefore would have increased by ₹4,55,000. The break-up is summarized in the table (refer workings).

In the year 2021, more emphasis was given to Quality Training, the spend increased by 75,000 p.a. Quality training is a preventive cost that is aimed at improving the quality of output/ performance of the employees. The benefit of this spend can be seen in the reduction of internal failure costs (scrap and rework costs).

The total internal failure costs of Scrap and Rework was ₹11,00,000 in the year 2020 that reduced to just ₹7,00,000 in the year 2021, this reduction of ₹4,00,000 per year is directly on account of the quality training given to employees. Better quality output resulted in reduced scrap and need for rework.

Material Inspection Costs decreased by ₹20,000 from 2020 and 2021. Appraisal costs check for conformance with accepted standards for production. The reduction in material inspection costs could be due to better understanding with the vendors about material requirements needed for production, better quality of materials procured etc. When the input material is of good quality and conforms with the production requirements, material inspection costs can be reduced substantially.

Better quality input material may also be a reason for the drastic reduction in rework and scrap costs highlighted above.

Product Inspection Costs increased by ₹40,000 from 2020 to 2021. This appraisal cost checks for conformity of the product with accepted standards of production. Quality checks on the production line is important to detect defects at the earliest. Product inspections during the manufacturing process (in-line product inspection) help in detecting defects while the product is being made. Defects can be corrected / rectified, or the unit produced can be scrapped.

Pre-shipment product inspection ensures that the product conforms with the specifications agreed with the customer. This control prevents defective units / non-conforming units from reaching customers, an external quality failure. External quality failure has costs in the form of product returns, warranty expenses etc. Product Warranty expenses reduced significantly by ₹1,50,000 from the year 2020 to 2021. This improvement can be attributed to better quality production and increased product inspection.

External quality failure has hidden costs in the form of shrinkage of market share, negative impact on brand image etc. Quality reassurance ensures that the goodwill of the company is maintained and there is no negative impact on the company's future business prospects.

Workings

Figures in Rs '000

Sr. No.	Particulars	2020	2021	Savings / (extra spend)
1.	Prevention Costs			
(a)	Quality Training	75	150	(75)
2.	Appraisal Costs			
(a)	Product Inspection	200	240	(40)
(b)	Materials Inspection	80	60	20
	Total	280	300	(20)
3.	Internal Failure Costs			
(a)	Scrap	600	300	300
(b)	Rework	500	400	100
	Total	1,100	700	400
4.	External Failure Costs			
(a)	Product Warranty	300	150	150
	Total (1+2+3+4)	1,755	1,300	455