After studying this chapter, you will be able to:

- **Evaluate** appropriate cost management and performance management techniques in case studies and other exercises which simulate real-life business situations to enhance the quality of decision-making and the creation of shareholder value.

- Understand the links between cost management, performance management and strategic management within the context of an organisation’s strategy.
13.2 STRATEGIC COST MANAGEMENT AND PERFORMANCE EVALUATION

Strategic Cost Management and Performance Evaluation

- Environmental Mgt. Accounting
- Ethics & Non Financial Considerations
- Strategic Cost Management
  - Value Recognition
  - Quality Management Tools
  - Value Management
  - Cost Management Techniques
  - Value Chain Analysis/Value Shop Model
  - Total Quality Management
  - Cost of Quality
  - Business Excellence Model
  - Value Analysis/Engineering
  - Process Innovation & Re-engineering
  - Target Costing
  - Life Cycle Costing
  - Throughput Accounting
  - EFQM
  - Baldrige Criteria
  - Business Process Re-engineering
  - Process Innovation

- Decision Making
  - Product Service & Delivery
  - Decision Making
  - Pricing Decision
  - Linking of CSFs to KPIs and Strategy
  - Divisional Performance Measures
  - Benchmarking
  - Lean System
  - Supply Chain Management
  - Internal
  - External
  - Financial
  - Non Financial
  - JIT, Kaizen, SS, TPM, Cellular Mfg., Six Sigma
  - Upstream and Downstream Flow
  - Transfer Pricing
  - ROI, RI, EVA, SVA
  - BSC; TBL; Performance-Prism, Pyramid etc.

- Performance Management
  - Standard Costing
  - Budgetary Control
  - Strategic Analysis; Analysis Through ABC
  - Beyond Budgeting
  - Behavioural Aspects

- Cost Control & Analysis
  - ABB & ABM

- Profitability Analysis

- Planning and Forecasting Tools
**ESSENTIALS FOR CASE STUDY**

<table>
<thead>
<tr>
<th>Case Study is not about the quantity, but the quality.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prepare a plan for each issue.</td>
</tr>
<tr>
<td>Decide what models to use and prioritize the issues.</td>
</tr>
<tr>
<td>Identify the impact and alternative actions that could be taken, as well as the relevant concepts and calculations required.</td>
</tr>
<tr>
<td>Answer should have a logical flow.</td>
</tr>
<tr>
<td>Offer a detailed analysis of the issues and conclude with sound, well justified recommendations.</td>
</tr>
<tr>
<td>Not to spend too much time on calculations.</td>
</tr>
<tr>
<td>Do not place too much attention and time on the presentation.</td>
</tr>
<tr>
<td>Quality of discussion on each issue which is most important, not the ranking order.</td>
</tr>
<tr>
<td>Discuss each of the issues in depth, explaining their impact.</td>
</tr>
<tr>
<td>Do not leave any of the issue undecided.</td>
</tr>
<tr>
<td>Recommendations should include ‘what to do’, ‘why to do it’ and ‘how to do it’.</td>
</tr>
<tr>
<td>Identify ethical issues and then briefly justify.</td>
</tr>
<tr>
<td>Recommendation should appear at the end of the report.</td>
</tr>
<tr>
<td>Practice makes perfect.</td>
</tr>
</tbody>
</table>
Sun Electronics manufactures and sells various electronic goods like mobile phones, laptops, televisions, refrigerator etc. The company sells these goods through the 30 stores situated in different parts of the country. The store managers place a request to the centralised team situated in Mumbai on a monthly basis. One store can send only one requisition per month.

The requirements of the stores are forwarded to the production planning team which is responsible for scheduling the manufacturing of these products. Once the goods are manufactured, the goods are sent to a central warehouse in Mumbai and are dispatched to different stores according to the store requirements. The time taken from placing a request from store to the delivery of product to the store takes about 30-40 days on an average. In the process the company procures parts from more than 100 vendors. The company has faced quality related issues with many vendors leading to delay in production.

The average holding period of inventory in Sun Electronics is very high at 45 days as against an industry average of 15 days. Since the order to delivery time at a store is very high, the company has traditionally allowed high inventory holding to reduce the stock outs at store level. The company is under severe pressure to improve its working capital cycle.

A high amount of inventory held at each store also means that the products become obsolete quickly. In case of products like mobile phones, new and upgraded versions are available in the market as early as six months from the date of initial launch of a particular model. A significant portion of inventory of mobile phones becomes obsolete every year. The company generally resorts to a discounted sale to liquidate such obsolete models.

The management at Sun Electronics has identified e-commerce as an opportunity for faster growth, both in terms of revenues and profitability. The company is considering launch of its own e-commerce website to sell all products which are currently being sold in physical stores. Depending upon the success of online sales, the company might choose to optimize and close certain physical stores in the next couple of years.

The management of the company is cognizant of the fact that existing inventory procurement and management system will not fit in the new e-commerce business. E-commerce works on a inventory light model and quick as well as on time delivery of products of the customers. The fact that customers could be from a location other than those where Sun Electronics has physical presence makes the matter complex.

**Required**

The company is considering implementation of a supply chain management system. Will a supply chain management system be of use to Sun Electronics in light of the e-commerce venture? You are required to EXPLAIN the concept of Supply Chain Management and EVALUATE the applicability of in the current case.
Solution

Issue

Sun electronics manufactures and sells various electronic products through its physical stores. The existing manufacturing system does not take into consider the demand of products in the market. Store managers are allowed to submit only one order per month. A high level of inventory can be seen at Sun Electronics as compared to the industry average. The store managers tend to keep high level of inventories as a safeguard against stock-outs. Whereas, keeping inventory to meet customer requirement is good, high level of inventories due to inefficient processes is not advisable.

The company also has a longer working cycle because of a long order to deliver time and excess holding of inventory. A significant amount of working capital is blocked due to this practice. Technology changes rapidly and the company is expected to roll out latest products in the market. A product like mobile gets outdated very soon and the company has to resort to discounted sales. This results in financial losses to the company.

The company has identified an opportunity in e-commerce. E-commerce businesses require leaner models and faster response time. The production must be based on the demand from the customer and not on an ad-hoc basis. In the following paragraphs, the importance of supply chain management (SCM) and its applicability in the current case is discussed.

Supply Chain Management (SCM)

Supply Chain Management can be defined as the management of flow of products, services and information, which begins from the origin of products and ends at the product’s consumption at consumer’s end. SCM also involves movement and storage of raw material, work-in-progress and finished goods. In other words, supply chain management involves management of all activities associated with moving goods from the raw materials stage to the end user. An important objective of SCM is to correlate the production and distribution of goods and services with demand of the product.

The following are the various activities which an organisation carries out to meet the customer requirements (Primary activities under value chain model) -

- Inbound Logistics covering procurement and related activities.
- Operations covering conversion of raw materials into finished products
- Outbound Logistics covering movement of products from plants to end users
- Marketing and Sales
- Service

Supply Chain Management looks each of the above activities as integrated and interrelated to each other. None of the activities can be looked in silos. In the case of Sun Electronics, there is a restriction on number of orders which a store manager can place. This would lead to excess ordering because of the fear of stock-outs.
The customer demand is completely ignored and hence the production is not in sync with the market demand. This could lead to excess production, higher inventory holding and longer working capital cycles.

The facts presented in the case indicate the following problems at Sun Electronics:

- Production planning is not based on customer demand & is done on an ad-hoc basis.
- Inventory Holding period is very high (45 days against an industry average of 15 days).
- The working capital cycle is longer.
- The time take to fulfil an order from the store is very high.
- The production is dispatched to a central warehouse for further deliveries to the stores. This could be an inefficient process.
- Liquidation of products at discount for products with low shelf life.

**SCM Process and applicability to Sun Electronics**

The SCM process is explained below:

- **Plan** - The first step in SCM process is to develop a plan to address the requirements of the customer. Sun Electronics must shift its focus from ad hoc and predetermined production planning to understanding the requirements of customers. Production must be planned based on the demand of products. The focus must be on producing what the customer wants.

- **Develop (procure)** - In this step, the materials required for production is sourced from various suppliers. A good relationship with supplier is required to ensure that the parts/materials are received as and when required by the production team. It is also important that the vendors supply quality material which is not the case in Sun Electronics. The company must select suppliers which are dependable and can deliver quality products in the stipulated time. The company must focus in reducing the lead time required for sourcing materials which will reduce the inventory holding period.

- **Make** - The third step is making or manufacturing the products required by the customer. This is quite different from the existing practice in Sun Electronics where store mangers are allowed to place only one order. This would mean that the company is not considering the ever changing demands and tastes of the customers.

- **Deliver** - The fourth stage is to deliver the products manufactured for the customers. This stage is concerned with logistics. The time required to deliver to the store in case of Sun Electronics is very high. The company must evaluate if the centralised warehouse is causing delay in delivery of products to the stores.

*Logistics* is one of the important component of the entire supply chain process. Right from procurement of material, movement of raw material in the plants and final delivery of products of customers, logistics play a critical role. An excellent system must be in place to ensure that the movement of materials and final product are uninterrupted.
**CASE STUDY 13.7**

**Warehousing** also plays an important role in today’s business environment. The company has a centralised warehouse to meet the needs of all its stores. This would not be the most efficient way. The company must evaluate creation of additional storage facility which would ensure timely delivery of goods to the stores. Newer products can reach the market faster.

**Benefits of SCM to Sun Electronics**

SCM looks at the entire value chain process as an integrated process. There is a seamless flow of information and products between suppliers and customers. The customer’s requirements would be captured to plan the production. The suppliers would be intimated to supply the materials according the the production plan. An effective logistics system ensures that movement of materials is seamless. Sun Electronics can also consider implementing an integrated ERP which would also interact with vendors on real time basis.

The following benefits of SCM can be envisaged for Sun Electronics -

- Better Customer Service as customer is supplied with what he/she wants in the minimum time.
- Better delivery mechanism for goods.
- Improves productivity across various functions and departments.
- Minimises cost (both direct and indirect).
- Reduces the inventory holding time and improves the working capital cycle.
- Enhances inventory management and assists in implementation of JIT systems.
- Assists companies in minimising wastes and reduce costs.
- Improves supplier relationship.

**E-Commerce and SCM**

The SCM is the backbone of E-commerce industry. Customers buying products online want deliveries to be faster. Another distinct feature of e-commerce is that buyers could be located in any corner of the country and not just restricted to the cities where Sun Limited has physical presence. This definitely means that the company must have an effective Supply Chain Management in place which could meet the customer’s requirement.

The existing practice of one order per month from each store would not work in the e-commerce space. Orders can come at anytime and from anywhere. Supply Chain Management would be required for success of e-commerce business.

**Customer Orders**

The company must have an effective mechanism to capture customer orders and feed it into the production planning on a real time basis. An integrated ERP system would be required for this purpose. Any delay in intimating the production team would mean delay in production and delivery which would not be taken positively by the customers. The existing system of one order per month from a store would not fit the purpose. A real time flow of information would mean lower inventory holding.
Procurement

The material requirements must be communicated to suppliers seamlessly. The company must identify those vendors who can deliver quality materials in the required time frame. A delay in supplies would delay the production process. A company cannot afford this in e-commerce business. Automatic exchange of information using EDI (Electronic Data Interchange) or Integrated ERP systems would ensure that the vendors receive material requirements in a timely manner.

Production

As discussed earlier, the production must be in accordance with the customer order. This requires a shift in approach of the production team. Business environments have shifted from “Customer will buy what we produce” to “We have to produce what the customers require”. The company would ideally not produce products to store them and sell later.

Logistics

Logistics would be the backbone of entire e-commerce set up. Right from sourcing of materials to delivery of products at the customer’s door step, logistics would play an important role. If the company has an in-house logistics facility, the logistics team must be trained with the requirement of the new business. If the company has outsourced the logistics, vendors must be briefed about the requirements of the e-commerce. The company might have to tie up with new logistic vendors to avoid any delay in deliveries.

CS-2: TRANSFER PRICING

Business Model

Rest Easy Company is a rapidly growing start-up in the technology sector. It develops customized ERP packages for clients across various business sectors. The business comprises primarily of two departments (1) consultant and (2) customer support. Consultant department has highly qualified professionals from management, accounting and technology background, who approach clients as a team and work out solutions that meet their needs. Customer support personnel are in charge of IT implementation and provide support through telephone, e-mail or on-site. Currently, the strength of the consultants department is 200 while that of customer support is 150.

Yash, the founder and CEO of the company, is very passionate about this business model. To deliver high-quality product solutions, he believes that his staff should be well-trained and up-to-date with developments in their professional fields. Therefore, Rest Easy provides periodic training to its staff in-house. All employees are expected to undergo 2 weeks of training annually. A training department has been set up with qualified trainers in various fields, who provide periodic training sessions to both Consultant and Customer Service departments. The training department has 5 trainers. Training sessions are aimed at providing skills that the executives
need to provide better service to their clients. This in-house focus of high-quality delivery, is the key factor that Yash believes would set apart Rest Easy from its competitors.

In addition to delivering training sessions, trainers are responsible for developing training material for routine, on-going as well as specialized training sessions. They attend conferences, train the trainer sessions and subscribe to journals to keep themselves up-to-date with various developments that consultants and customer support executives need to be aware of.

At the beginning of each year, heads of consultant and customer service departments advise the training department on the expected number of training sessions that their staff would undertake. In special situations, where developments need to be communicated rapidly, extra sessions can also be conducted. Training department budgets are prepared based on these needs.

**Transfer Pricing - Training Cost Allocation**

Cost incurred by the training department is allocated to the consultant and customer service department based on the training sessions availed by both departments. A standard quote (transfer price) based on budgets is provided at the beginning of the year. At the end of the year, actual cost is allocated based on actual training sessions of each department.

Each of the user departments use the transfer price to prepare their individual budgets, that further gets built into their pricing models used for billing clients. One of the metric for manager appraisal is also the financial performance of their individual departments. Hence, managers of both consultant and customer service departments are very cost conscious.

Figures for budget and actual costs for 2017 of the training department are as follows:

<table>
<thead>
<tr>
<th>Cost Particulars</th>
<th>Budget</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salaries</td>
<td>25,00,000</td>
<td>30,00,000</td>
</tr>
<tr>
<td>Depreciation on Office Equipment</td>
<td>2,00,000</td>
<td>5,00,000</td>
</tr>
<tr>
<td>Software Licenses for Training Packages</td>
<td>80,000</td>
<td>1,05,000</td>
</tr>
<tr>
<td>Conference Travel for Train the Trainer Sessions</td>
<td>10,000</td>
<td>15,000</td>
</tr>
<tr>
<td>Telephone</td>
<td>20,000</td>
<td>25,000</td>
</tr>
<tr>
<td>Training Supplies</td>
<td>50,000</td>
<td>60,000</td>
</tr>
<tr>
<td>Trainee Lunch</td>
<td>100,000</td>
<td>120,000</td>
</tr>
<tr>
<td><strong>Total Expenses</strong></td>
<td><strong>29,60,000</strong></td>
<td><strong>38,25,000</strong></td>
</tr>
</tbody>
</table>

Consultant and Customer service departments are charged based on the number of training sessions actually availed. Details of training sessions for each department are:

<table>
<thead>
<tr>
<th>Department</th>
<th>Budget</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consultant</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Customer Service</td>
<td>100</td>
<td>80</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>200</strong></td>
<td><strong>180</strong></td>
</tr>
</tbody>
</table>
Problem of Goal Congruence

In accordance with the above explanation, the training department quoted a rate of ₹14,800 per session based on the budgeted cost and budgeted training sessions. (Budgeted cost ₹29,60,000 for 200 training sessions). Actual cost per session is ₹21,250 (Actual cost ₹38,25,000 for 180 training sessions). Cost overrun of ₹6,450 per session, a jump of 44% from the original quote. Consequently, a meeting was called that was attended by the managers of consultant, customer service and training departments, along with the CEO Yash.

The user departments were unhappy with the higher charge. Manager of the consultant department raised the following concerns:

(a) The market rate for similar trainings provided by external vendors was only ₹12,000 per session. He has accepted a higher transfer price of ₹14,800 per session only because the in-house training program was more customized towards Rest Easy’s end-user-clients. However, if the department is actually going to be charged ₹21,250 per session, he would rather source the training to the outside vendor.

(b) Further, he pointed out that while his department had adhered to its commitment of 100 training sessions, the customer service department has availed of 20 lesser sessions than its commitment. Reviewing the cost structure of the training department, most of the expenses are fixed in nature. Therefore, when the transfer price is based on the actual cost and actual training sessions, the per session cost has increased because the customer service department did not undergo the entire 100 sessions. He questions, why he should bear a higher allocation of cost due to variance in actual and budgeted usage of training resources of the customer service department?

Manager of the customer service department explained that the variance of 20 training session is on account of the executives handling high-priority work pressure that did not allow them enough time to complete some of the training sessions. At the same time she contended that she should not be charged for those 20 sessions for which no training was availed.

Manager of the training department explained that the ₹500,000 cost overrun on salary due to new hire of a trainer. The trainer’s experience is very valuable to the company and hence to get her on board, the company had to offer a higher pay scale. Depreciation on office equipment was higher by ₹300,000 due to higher replacement cost of ageing equipment. A specialized software license resulted in an excess spend of ₹25,000. The manager argued that the rest of the expenses were normal increases which were not controllable.

Yash, the CEO, was understandably not happy with the cost over-run. Higher internal transfer price to the end user departments would affect employee morale. However, even though a cheaper option was available from an outside vendor, he could still foresee the value of investing in in-house training programs. Intangible benefits from these customized sessions, would definitely help the company’s growth.
To conclude, he was not willing to shut down the training department. At the same time, he had to resolve the dispute resulting from internal transfer pricing in an amicable way. Like profits, teamwork is critical to success.

**Required**

(i) **IDENTIFY** the threats to goal congruence due to internal transfer pricing.

(ii) **During the meeting, an alternate transfer pricing methodology based on two-part pricing system was formulated. Costs would be segregated into fixed and variable categories. A transfer price for each category would be arrived based on budgeted costs and budgeted usage. The standard rate for fixed cost will be applied to the budgeted training sessions and charged to the user departments. The standard rate for variable cost will be applied to the actual training sessions and charged to the user departments. Fixed cost would be defined as those that are not directly impacted by the number of training sessions.**

CALCULATE the transfer price to be charged to each department under this method.

(iii) **EVALUATE** how the two-part pricing price method of transfer pricing address the threats to goal congruence as identified in question 1?

**Solution**

(i) Threats to goals congruence due to internal transfer pricing are:

(a) User groups, consulting and customer service department are concerned that training department is not controlling its costs. Since the entire actual costs gets allocated to the users, training department may not be managing its costs efficiently. Since the financials of user departments are affected, it may lead to conflict between the departments.

(b) Yash, the CEO is a firm believer of in-house training and its benefits. However, there are outside vendors that provide similar service at substantially reduced costs. Performance assessment of managers of consulting and customer service are based on their department’s financial metrics. Higher internal transfer price for training would affect employee morale since they have no control over these allocated costs. However, their performance is being evaluated based on uncontrollable factors. This could lead to discontent among the managers. Alternatively, Yash may want to re-consider his strategy of in-house training. When suitable, training can be sourced to cheaper options available in the market, without compromising on quality.

(c) Most costs of the training department are fixed in nature, as they need to be incurred irrespective of the number of training sessions. These costs are being allocated to the users based on actual training sessions. The budgeted target price is used by the user departments, to determine their billing model to Rest Easy’s end user clients. Hence it is important that the budget transfer price is not very different from the actual transfer price charged at the end of the year.

In the given problem, internal transfer price has been based on a budget of 200 sessions. Here the customer service department does not adhere to its commitment of 100 training...
sessions, training sessions actually availed are only 80. Since costs are mostly fixed in nature, the actual cost per training session increases. This is then charged out to the consultant and customer service departments. Consequently, despite meeting its commitment, the consultant department bears a higher cost allocation due to variance in the usage of training resources. This can lead to friction between the user departments.

(ii) By segregating the costs into fixed and variable components, Rest Easy is working out two-part pricing system for transfer price.

Two-Part Pricing System = Lump-Sum Charge + Marginal Cost

To segregate the costs into fixed and variable categories, the criteria is whether the costs change per additional training session. Accordingly, the classification of costs will be as below:

<table>
<thead>
<tr>
<th>Cost Particulars</th>
<th>Budget (₹)</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salaries</td>
<td>25,00,000</td>
<td>Fixed</td>
</tr>
<tr>
<td>Depreciation on Office Equipment</td>
<td>2,00,000</td>
<td>Fixed</td>
</tr>
<tr>
<td>Software Licenses for Training Packages</td>
<td>80,000</td>
<td>Fixed</td>
</tr>
<tr>
<td>Conference Travel for Train the Trainer Sessions</td>
<td>10,000</td>
<td>Fixed</td>
</tr>
<tr>
<td>Telephone</td>
<td>20,000</td>
<td>Fixed</td>
</tr>
<tr>
<td>Training Supplies</td>
<td>50,000</td>
<td>Variable</td>
</tr>
<tr>
<td>Trainee Lunch</td>
<td>100,000</td>
<td>Variable</td>
</tr>
<tr>
<td><strong>Total Expenses</strong></td>
<td><strong>29,60,000</strong></td>
<td></td>
</tr>
</tbody>
</table>

The lump-sum charge would be based on the fixed cost budget. Marginal cost would be based on the variable cost budget.

Total budget fixed expenses = ₹28,10,000 and total budget variable expenses = ₹150,000. Number of training sessions is 200, that is 100 each for consultant and customer service departments. Hence the fixed cost allocation rate would be ₹14,050 per session and variable cost allocation rate is ₹750 per session.

Transfer price to the consulting department = lump-sum charge + marginal cost

\[
\text{Transfer price to the consulting department} = 14,050 \times 100 + 750 \times 100 = 14,05,000 + 75,000 = 14,80,000.
\]

Transfer price to the customer service department = lump-sum charge + marginal cost

\[
\text{Transfer price to the customer service department} = 14,050 \times 100 + 750 \times 80 = 14,05,000 + 60,000 = 14,65,000.
\]
CASE STUDY 13.13

\[
\begin{align*}
\text{Total transfer price allocation} & = ₹14,05,000 + ₹60,000 \\
& = ₹14,65,000.
\end{align*}
\]

Total transfer price allocation is ₹29,45,000 versus actual expenses of ₹38,25,000. Unallocated expenses are ₹880,000.

(iii) Evaluate how the two-part transfer pricing model would address the goal congruence issues listed in question 1?

(a) Since transfer prices are based on budgets, the training department would become more cost-conscious. As explained above, as per this transfer pricing method, unallocated expenses of ₹880,000 would have to be borne by the training department. As given in the problem, this variance is mainly on account of extra cost for the newly hired trainer and the higher depreciation expense. The department will be more cautious while taking future decisions. However, Yash the CEO must ensure that the quality of training is not compromised and remains in line with the company’s strategic policy.

(b) Internal transfer price of ₹14,800 per session is still higher than the outside rate of ₹12,000 per session. Further decisions would be based on the company’s strategic objective. At the same time, if the number of training sessions are expected to increase beyond the budget, this transfer pricing method charges the user department only a marginal cost of ₹750 per session. This is definitely lower that the external rate.

(c) Under this method, fixed expenses that form majority of the cost are allocated based on budgeted cost and budgeted usage. Variable expense are allocated based on actual training sessions. Hence, any variance in the utilization of training resources, does not impact the other user department.

Therefore, most of the goal congruence issues can be addressed through this methodology.

CS-3: KAIZEN COSTING

Zen Limited is a leading mobile manufacturing company and sells its mobile phone across the world. In a fast-changing technological environment, Zen has been able to maintain its leadership in smartphones segment for third year in a row now. Though the revenues have grown year on year, the costs have increased at a higher rate in the mobile phone industry as a whole.

“We have been leaders in revenue. We must lead in cost reduction front as well. I believe we can achieve this with improvements overtime, however minor they might be!”

– This is what the CEO of Zen has told its directors in a recently concluded board meeting.

The net profit margins of the company has fallen from 10% in 2016 to 8% in 2017 owing to rise in raw material & repair cost. Another significant rise in the cost was on account of repairs of mobiles which are under warranty. There was an increase in these repair costs by ₹1.5 crores which represents 1% of the total turnover of the company.
The process of repairs/ replacement of under warranty product is outlined below:

- The company own 200 repair centres in various cities in India.
- A customer whose phone is under warranty and requires replacement/ repair visits any of the 200 centres to deposit the faulty mobile phone.
- The technician at service centres examines the phone and the service centre sends the phone to a centralised repair centre at Mumbai. The phones are sent to Mumbai even for minor repairs which can be done locally if requisite infrastructure is provided to the service centres.
- The phones are sent in batches. Each service centre creates 3-4 batches of mobile phones in a day. (A recent study showed that the batches could be combined into a single batch per day)
- The phones are repaired in Mumbai’s centralised centres and sent back to the respective service centres for handing them back to the customer. The phones which are repaired are sent in separate batches and those which are replaced are sent in separate batches.

**Required**

You are working as a Finance Manager in Zen. The finance director has approached you to understand whether the minor improvement would be useful given the size of the company. The Finance Director has asked you to examine the process of warranty repairs and replacement and submit a report covering the following aspects:

(i) What is the CEO referring to when he says “minor improvements”?
(ii) What are the benefits of such minor improvements?
(iii) Apply the above process to the warranty claim process and explain how the process can be improved.
(iv) Any other matter which you consider relevant.

**Solution**

**Issue**

Zen limited is a leader in manufacturing of mobiles and is concerned about increasing costs. The increase in warranty related costs has been significant in the current year as compared to previous year. This has reduced the net profit of the company by 1% of sales.

**Applicability of Kaizen Costing**

“Kaizen” is a Japanese word which means “Change for Better”. In business parlance, Kaizen is used to refer to small and continuous improvement across all functions, processes and employees. Kaizen costing is a cost reduction system. Yashio Moden defines Kaizen Costing as “the maintenance of present cost levels for products currently being manufactured via systematic efforts to achieve the desired cost level.”
CASE STUDY 13.15

Toyota Production System is considered as a pioneer in Kaizen Costing. Though the model was used for eliminating wastage from production at factory initially, the concept can be applied in any of the processes in a business. Since Kaizen is a continuous improvement process, a radical change or disruptive innovation is not expected in Kaizen costing.

The following are the key features of Kaizen -

- Kaizen processes focus on eliminating waste in the systems and processes of an organisation, improving productivity and achieving sustained continual improvement.
- Application of small, incremental changes routinely applied and sustained over a long period can lead to significant improvements.
- It aims to involve workers from multiple functions and levels in the organisation.
- A value chain analysis helps to quickly identify opportunities to eliminate wastage.
- Although incremental changes can often be too small to be seen, Kaizen can be very effective in the long run. An airline which identified that 75% of its flyers would leave the olive from salad, the airline decided to remove it from its servings. This saved the airline $40,000 per year. Another example is where an airline stopped printing its logo in the rubbish bags as it did not add value saved over $300,000 per year.

The CEO is referring to Kaizen costing when he mentions minor improvements to save costs over time. Kaizen costing takes into consideration various costs such as costs of supply chain, manufacturing costs, marketing, sales, distribution costs etc.

Benefits of Kaizen Costing

- Kaizen reduces waste in areas such as employees waiting time, transportation, excess inventory etc., which leads to improved efficiency in overall business processes and systems.
- A company applying Kaizen philosophy can achieve cost reduction through small incremental improvements and cost savings.
- Kaizen looks at functions and processes at all levels of organisation and requires participation of all employees and massive as well as open communication system. This participative approach improves teamwork across the organisation.
- Product improvement using Kaizen is likely to result in less number of defective products leading to customer satisfaction and reduction in warranty related costs.
- The reduction in wastage, improved efficiency and cost reduction improves the overall profitability of the company.

Implementation of Kaizen in the Current Case

The implementation of Kaizen as a cost reduction techniques can take several forms. The key question to ask for implementation is - “Can we eliminate waste?”. The waste can take several forms like -

- Unnecessary movement of material and men - Travelling for meeting in cases where a video conferencing could help.
- Unwanted part in a product which if removed is not likely to impact the performance of the product. (Nano sim card has reduced a significant portion of use fibre boards as compared to the traditional sim cards.)  
- Defects which involve extra cost in terms of reworks. 
- Waiting time - A simple example could be locating for files in your computer which has not be arranged properly. This leads to waste of time.

The above is just an indicative list where improvements can be made. However, an important point to note is that reduction of waste should not be done by compromising the quality of product. Apple launched iPhone 5c as a budget phone by using plastic material instead of Aluminium. The market did not like the product as it was considered to be an inferior product as compared to iPhone 5s.

Another way of looking at Kaizen is asking following questions -
- Can we eliminate functions from the production process without compromising the quality and utility of end products? - Removing unnecessary movements of material and men.  
- Can we eliminate some durability? - Use of unbreakable plastic for producing disposable glasses would be waste of resources 
- Can we minimise design? - e.g. use of Nano Sims.  
- Can we substitute parts of the product being manufactured? 
- Can we take supplier’s assistance to get better quality parts? 
- Is there a better way? - This is a question which must be asked continuously to ensure that the improvement is not a one-time exercise.

(The above questions also form a part of the Value Engineering Process)

Application of Kaizen at Zen Limited

The current warranty claim process at Zen involves movement of mobile phones from various service centres across the country to a centralised centre in Mumbai. The possible improvements in the claim process is explained below -

- The company needs to analyse whether it requires to own 200 centres by itself across the country. The company can evaluate closing down centres with less customer footfalls or outsource the ones which are not located at the strategic location. This would save some cost to the company. 
- The current process requires each service centre to send the faulty mobile phones back to Mumbai for repair or replacement. This is done even in case of minor repairs which can be handled locally. The company can provide necessary infrastructure to the service centres to carry out minor repairs locally. This would save logistics cost of sending the phones to Mumbai and back to service centre. The company should analyse the past data to understand the proportion of phones which require minor repair. Repairing the phones locally would also reduce the turnaround time and the customer will get back the phone faster.
The current process is to send phones in 3-4 batches in a day. This effectively means creating 3-4 consignments, documents for dispatches and incurring extra costs for transportation. Combining the phones in a single batch would reduce the cost of transportation and administrative cost as well.

The phones can be sent back from Mumbai in single batch instead of creating multiple batches to save transportation costs.

The above improvements must be revisited continuously to derive required benefit from Kaizen process.

Apart from eliminating waste in the warranty claim process, the company must also identify root causes of increase in warranty claims in the current year as compared to previous year. Every phone being sent back for repair/replacement involves avoidable cost. The company must also revisit the manufacturing process and quality control processes to eliminate wastage in production process and improve quality.

- Zen can consider producing better quality mobiles at the manufacturing process to reduce the warranty claims.
- The pattern of warranty claim must be analysed to understand whether there is certain common problem related to repair claims. If the issue has some relation with parts used in mobile, the issue can be taken up with supplier of such parts.

CS-4: BALANCED SCORECARD

**Fair Limited** manufactures and sells motor vehicles in India and different parts of the world. The company has its head office in New Delhi and three regional offices. The manufacturing plants are situated in Pune and Bhubaneshwar. The company has over 10,000 employees who are paid a fixed salary and a performance related pay (PRP).

The PRP is determined using the financial performance as a measure. The performance of departments which are profit centers is based upon the revenues and profits the departments generate. The performance of cost centers is based upon the cost savings against the budget.

Of late, the company has identified critical issues with the motor vehicles manufactured and sold in the market. In the last one year, itself, the company has recalled more than 2 lakh vehicles owing to quality issues like faulty gearbox, issues with axle, braking systems etc. The company was also penalized for selling vehicles which does not meet the emission norms.

The board of directors carried out an internal review of these frequent recalls and issues with the vehicles. In most of the cases, it appeared that the recall of vehicles was on account of lower quality of material and parts used. A couple of critical quality and emission checks were ignored to dispatch more vehicles in the limited time, leading to higher sales and profits.
The board is concerned with the reputational risk with the issue related with recalls. The company was consumer’s most trusted brand for last three years in a row. It is unlikely to win the award this year due to negative feedback from customers. The board wants to win the trust of the customers back and be profitable as well.

Required

You are the advisor to the board. The board seeks your advice on the following aspects:
(i) Advantages and disadvantages of using financial measure as a performance measure.
(ii) SUGGEST an alternative performance measure which includes non-financial measures as well.
(iii) IDENTIFY 2 critical success factors and 2 Key Performance Indicators for the performance measure chosen in (ii).

Solution

What is the issue?
Fair limited is into manufacturing of motor vehicles. The company has used financial measures for performance. Of late, the company has faced quality related issues leading to vehicle recalls. The company has also been penalized for violating emission norms. Since the company has been using financial measures only, it appears that non-financial aspects related to quality have been ignored. The company has adopted the principle of profit at any cost which can be seen from use of low quality materials and parts as well as skipping key quality checks.

Financial Performance Measure

Financial performance measures focus on financial results or aspects. These measures focus on the profits made by a business or a unit of business. They also include costs saved against budgets. Various financial performance indicators include – growth in revenue, profitability, variance from budget, Return on Capital Employed etc.

In the case of Fair limited, the performance of employees is done on the basis of financial performance indicator. When performance is evaluated on financial parameters, the employees and managers tend to focus only on profitability in anticipation of higher bonuses and pays.

The problems related to quality issues in vehicles produced by Fair limited might be linked to the use of financial performance measure. Low quality parts are used to save costs and improve profitability. The quality checks prior to sales were also skipped to sell more vehicles with limited resources. This is an apparent case of compromise in quality for seeking higher profits and revenues. In light of above, the advantages and disadvantages of financial performance measures are given below.

Advantages
- Focus on financial objectives and is linked to the overall objective of wealth creation of shareholders.
- Such measures are objective.
CASE STUDY 13.19

Quantification of results is possible.
- The measures are comparable across companies of a particular industry.
- The framework to measure financial performance is established in most of the cases.

Disadvantages
- Focus on short term profits and ignores long term sustainable growth. As can be seen in the case of Fair Limited, the company has compromised quality for short term profits. This is harmful to the company in the longer run.
- This measure can be distorted by inflation. A 5% growth in sales might be good but if the inflation is 6%, the real growth is negative.
- Financial information might be manipulated to show a better performance.

Non-financial performance measures use measures other than financial to measure performance of employees and departments. The advantages of non-financial measures are
- Non-financial measures help business to measure every area whether financial or non-financial. Financial measure would not be able to suitably measure areas like performance of IT department.
- It focuses on qualitative aspects as well.
- These measures take a long-term view unlike financial measures where employees tend to take a short term view.

The disadvantages of Non-Financial measures are:
- These require huge amount of information to measure each area of performance and might lead to shift of focus from core goals and values.
- These can be subjective as non-financial measures cannot be generally quantified.
- Non-financial measures like measures of quality are difficult to measure.

Balanced Scorecard

An alternative performance measure which focuses on both financial and non-financial measures is the Balanced Scorecard. It outlines four key areas in which company and divisional performance should be measured to focus on both the short and long term needs of the organisation. The key idea is that managers are to be appraised on a variety of measures which include non-financial measures so that their focus is both long and short term.

As discussed earlier, it appears that managers at Fair Limited have ignored long term sustainable growth and qualitative factors and focused on short term profits and sales. This is one of the key disadvantages of a financial measure of performance. The company can start measuring performance both on financial as well as non-financial aspects. This would ensure that employees are not short sighted on profits alone.

The four areas or perspectives in a Balanced Scorecard are –
13.20 STRATEGIC COST MANAGEMENT AND PERFORMANCE EVALUATION

- **Financial Perspective**
  Financial perspective focuses on financial performance of the business and divisions. The various financial measures used by companies are profitability, revenue growth, cost control etc. This is currently being used in Fair limited to measure performance.

- **Customer Perspective**
  This perspective views organizational performance from the point of view the customer or other key stakeholders that the organization is designed to serve. These could include measures like customer satisfaction index, percentage of returns, percentage of goods delivered on time etc.

- **Internal Business Perspective**
  This perspective views organizational performance through the lenses of the quality and efficiency related to product or services or other key business processes. The measures under internal business perspective could be number of defective products produced, production performance per unit of time etc.

- **Training and Development/ Learning and Growth Perspective**
  This perspective views organizational performance through the lenses of human capital, infrastructure, technology, culture and other capacities that are key to breakthrough performance. The key measures could be number of new products produced, amount invested in training and development etc.

In each category/Perspective, the organisation must follow through from the business strategy, to ensure they are focused on the long-term direction of the business. Clear objectives should be set under each category according the SMART criteria (Specific, Measurable, Achievable, Relevant and Time-bound), measured at the end of the period, and lessons learnt from actual results to help to improve performance in future periods and keep the organisation on track to achieve its strategic goals.

**Applying Balanced Scorecard to Fair Limited**

The issues related to quality have arisen at Fair Limited as the managers and divisions focused on profits at the cost of quality. The recall of vehicles was primarily on account of use of sub-standard parts. The company should consider using non-financial measures as well as a performance measure. Balance scorecard can be effective tool to apply financial and non-financial measure.

The company must take steps to put focus on quality related aspects as well as financial aspects. A proper application of various Key Performance Indicators under the respective Critical Success Factors can help the company overcome the current issue.

Critical success factor (CSF) is a management term for an element that is necessary for an organization or project to achieve its mission. It is a critical factor or activity required for ensuring the success of a company or an organization. These are the key areas in which the organisation has to do well if they are to remain competitive and profitable. The critical success factors have to be linked with the overall strategy of the organisation.
Key Performance Indicators (KPIs) are the ways in which the organisation’s performance for the CSF can be measured. It is a measurable value that demonstrates how effectively a company is achieving key business objectives. Organizations use KPIs to evaluate their success at reaching targets.

The Critical Success Factors and Corresponding KPIs for Fair limited for each of the perspective in the balanced scorecard is given below:

<table>
<thead>
<tr>
<th>Perspective</th>
<th>Critical Success Factors</th>
<th>Key Performance Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Financial</strong></td>
<td>▪ Be the Most Profitable Company in Motor Vehicle Industry.</td>
<td>▪ Profitability ratios.</td>
</tr>
<tr>
<td></td>
<td>▪ Become the No.1 Company by in terms of Market Share in five years.</td>
<td>▪ Revenue growth.</td>
</tr>
<tr>
<td></td>
<td>▪ Profitability ratios.</td>
<td>▪ Variance to budget.</td>
</tr>
<tr>
<td></td>
<td>▪ Revenue growth.</td>
<td>▪ Number of vehicles sold.</td>
</tr>
<tr>
<td></td>
<td>▪ Number of vehicles sold.</td>
<td></td>
</tr>
<tr>
<td><strong>Customer</strong></td>
<td>▪ Be No.1 Choice of Customers.</td>
<td>▪ Number of vehicles sold vis-à-vis those sold by competitors.</td>
</tr>
<tr>
<td></td>
<td>▪ Implement Zero Recall Policy.</td>
<td>▪ Number of recalls of vehicles.</td>
</tr>
<tr>
<td><strong>Internal Business</strong></td>
<td>▪ Total Quality Management.</td>
<td>▪ Number of defective cars produced.</td>
</tr>
<tr>
<td></td>
<td>▪ Zero Idle Time at Factory.</td>
<td>▪ Number of cars returned by customers as faulty.</td>
</tr>
<tr>
<td></td>
<td>▪ Number of hours spent in waiting by labours at assembly line.</td>
<td>▪ Number of hours spent in waiting by labours at assembly line.</td>
</tr>
<tr>
<td><strong>Training and Development</strong></td>
<td>▪ Upto Date Technology used in Manufacturing Facilities.</td>
<td>▪ Amount spent in research and development year on year.</td>
</tr>
<tr>
<td></td>
<td>▪ Skill Development for Labour and Supervisors.</td>
<td>▪ Number of training hours undergone by workers and supervisor.</td>
</tr>
<tr>
<td></td>
<td>▪ Number of new model of vehicles launched.</td>
<td></td>
</tr>
</tbody>
</table>

**CS-5: PERFORMANCE PRISM**

**Galaxy Limited** is in the business of logistics and distribution. In 2002, Galaxy limited had implemented Balance Scorecard as a performance measurement & management system. The balanced scorecard measures performance across Financial, Customer, Business and Innovation perspective. The implementation of Balanced Scorecard had the following impact -

- The company’s financial performance improved substantially.
- The complaints from customers regarding poor service reduced.
- The company has pioneered in innovation in the field of door to door delivery of goods.
All these led to improvement in profitability of the company. The share prices are trading at life time highs. Since the ultimate objective of a commercial organisation is to maximise shareholder’s wealth, the CEO of the company is extremely pleased with the affairs at the company.

Of late, the company has witnessed high employee turnover ratio. Though the company has a formal exit interview process for the resigning employees, the inputs received from these interview is rarely considered in improving the HR practices. One of the common feedback from employees who left the company was that there is too much pressure to perform and improve customer service without adequate support of systems and processes.

Also, the truck drivers who move consignment from one city to another have been on strike thrice in the last one year demanding better pay and working conditions. These drivers are generally hired on contractual basis. They are not entitled to any retirement benefits. The drivers have been insisting that they be taken as permanent employee and are given benefits applicable to employees of the company.

The above two issues were discussed in one of the board meetings. The directors wondered if they had the right performance measurement mechanism to address the issues. The company is doing great financially but must also ensure that the employees and other stakeholders are taken care of apart from shareholders. The board is also concerned that they have too much of data and reports to look at on performance management as the current measurement is done on a monthly basis. However, the alignment of such reports to the overall strategy of the company is missing.

**Required**

RECOMMEND an alternative performance measurement mechanism which considers all stakeholders instead of just shareholders and employees.

**Solution**

**Issue**

Galaxy limited use Balance Scorecard to measure performance. Balance scorecard focusses on the financial, customer, business and innovation perspectives. The company has been doing great on financial parameters and customer satisfaction parameters. However, of late the company has been facing issues related to high employee turnover and dissatisfaction of the truck drivers.

The board of directors is also concerned about the volume of performance measurement data and alignment of performance measurement with the strategy of the company. An alternate performance measurement mechanism is Performance Prism.

**Performance Prism**

Performance Prism is considered to be a second-generation performance management framework conceptualized by Andy Neely and Chris Adams. The following are the factors which make Performance prism should replace the models like Balanced Scorecard -

- Organisations cannot afford to focus on just two stakeholder group - Investors and Customers. Other stakeholders group like employees, suppliers, government etc. should not
be forgotten. This is important for sustainable growth of companies both profit oriented and non-profit oriented.

- Most of the performance measurement models do not focus on changes that could be made to the strategies and processes. The underlying assumption is that if right things are measured, the rest will fall into place automatically.
- Stakeholders expect something from the organisation. The organisation also must expect contribution from the stakeholders. There is a ‘Quid Pro Quo’ relationship between the stakeholders and organisation.

Another problem highlighted by Andy Neely and Chris Adams was that management are measuring too many things. They believe that in doing so they are controlling the organisation well. The problem with increased measurement is that the management starts micro-managing things and lose sight of the strategic direction. This negatively impacts the organisation in the longer run.

The performance Prism aims to measure performance of an organisation from five different facets listed below:

- Stakeholder Satisfaction
- Stakeholder’s Contribution
- Strategies
- Processes
- Capabilities

**Stakeholder Satisfaction**

The first facet of prism focusses on stakeholder’s satisfaction. Though balanced scorecard also focusses on stakeholder’s satisfaction, it is primarily concerned with the shareholders and customers and ignores other stakeholders. This is precisely the issue at Galaxy limited where the shareholders and customers are happy with the company, other stakeholders are not.

The company must identify all stakeholders and determine relative importance of each of the stakeholders. The company can use Mendelow’s matrix to identify key shareholders in terms of power and interest of stakeholders. A stakeholder group which has high power and high interest (say a trade union) must be kept satisfied. The key stakeholders for a company are:

- Investors - They want return on investment.
- Customers - They want good quality products at cheap prices.
- Suppliers - They want better price for products.
- Government - They want revenues and development.
- Society at large - They want employment opportunities.

Each of the stakeholders group exercise different level of power/influence on the company. The interest of each stakeholder group in the company also differs. Based on the power and interest of the stakeholders, the company must appropriately perform activities for stakeholder’s satisfaction.
After identification of the stakeholders, the company must identify the requirements of each of the stakeholders group. What must the company do to ensure stakeholder satisfaction?

Galaxy limited must ensure satisfaction of the two stakeholders highlighted above. The company must take steps to improve employee satisfaction and reduce the employee turnover. The company must also address the issues related to truck drivers and involve them in a dialogue. The impact of not keeping these stakeholders group satisfied is that the company might suffer financially in the longer run.

**Performance measure - Employee Turnover Ratio, Average employment duration of employees, Number of strikes by truck drivers etc.**

### Stakeholders Contribution

In the second facet of Performance Prism, the organisations identify the contribution required from the stakeholders. The organisations must then define ways to measure the contribution of stakeholders. This aspect is different from traditional measures where the organisations were just concerned with what they could contribute to the stakeholders.

The company would take steps to provide better service to its customers. In return the customers must contribute in terms of profits and revenues to the company. There is a ‘Quid Pro Quo’ relationship as described earlier.

In case of Galaxy limited, the company could improve the employee satisfaction with better pay, training and growth opportunities. In turn, the employees must perform better to contribute to the company as a whole. Similarly, the drivers must be given better working conditions and in turn, they should contribute towards improving efficiency and on-time deliveries.

**Performance Measure - Efficiency of Employees, Productivity, On Time deliveries by Truck drivers.**

### Strategies

In the strategies facet of the Prism, the organisation should identify those strategies which the organisation would adopt to ensure that -

- The wants and needs of the stakeholders are satisfied
- The organisation own requirements are satisfied by the stakeholders.

After the company identifies strategies, the performance measures must be put in place to confirm that the strategies are working. The various aspects to be considered appropriate communication of strategies, implementation of strategies by managers and continuous evaluation of appropriateness of strategies.

Galaxy limited might come out with a strategy of to retain employees by means of better pay and growth opportunities within the company. This strategy can be called successful if the higher pay ensures that employees turnover is reduced. As a strategy, the company can start to hire drivers on the payrolls of the company.
CASE STUDY 13.25

Performance Measure - Number of employees leaving the organisation after getting pay hike, Efficiency of deliveries after Truck drivers are put on employment of company.

Processes

After identifying the strategies, organisations need to find out if they have the correct business processes to support the strategy. The various business processes can have sub-processes. Each process will have a process owner who is responsible for functioning of the process.

The organisations must develop measures to evaluate the how well the processes are working. The management must be careful to evaluate most important processes instead of evaluating all the processes. Porter’s Value Chain analysis can be used to identify and evaluate various processes in the organisation.

Galaxy limited could devise a recruitment process which results in transparency in hiring and pay of employees. The process could be owned by the Human Resources Manager. The working condition of drivers can be improved by providing structured training and working conditions.

Capabilities

Capabilities refers to the resources, practices, technology and infrastructure required for a particular process to work. The company must have right capabilities in order to support the processes. The company must identify performance measures to set how well the capabilities are being performed.

While Galaxy limited might choose to increase the salaries of employees, an important question to answer is whether the company has financial capability to do so.

Conclusion

The facets of Performance Prism are interlinked and must support each other. The company must first identify the stakeholder wants and what the company wants from those stakeholders. The required strategies for these are identified and the processes to achieve the strategy followed by identifying the capabilities to perform these processes.

CS-6: TOTAL PRODUCTIVE MAINTENANCE

Super Refineries Limited is a leading oil refining company operating in India. The company has three plants - one each situated in North, South and West. The company has a refining capacity of 30 million barrels. The company currently enjoys a 40% share of the domestic market. The plants run on all 365 days in a year and operate at 100% of the capacity. The company currently does not have any maintenance schedule in place for its plant and machinery. Any repair requirement of plant and machinery is carried out on ad-hoc basis.

The company has implemented Total Quality Management (TQM) to ensure that the company rolls out top quality products. The company did not receive any complaints from its customers.
regarding poor quality of products or products not meeting the specifications. The entire production team is quite excited with superior quality of products.

However, in the last three months, about 30% of the dispatches to customers were delayed. This comes at a time when the entire plant had to be shut for maintenance activity due to breakdown in the machineries for a week. The company also witnessed 20% rejection of the final products. The customers claimed that the products did not meet the specification agreed by them with the company. The Director of Refineries is worried about the worsening situation of production at plants. Another concern for the director is the increase in number of accidents and loss of productive time due to this.

The chairman of the company convened an urgent meeting of the Board of Directors to understand the impact and reasons of the situation at production plants. A key issue highlighted by plant supervisors is that the scheduled maintenance activity for plants was never carried out. The underlying assumption for not carrying out such maintenance activity was - "Since the plant is running smoothly, there is no requirement of preventive maintenance activity. Such activities cost a lot in terms of money and also cause loss of productive time which could otherwise be used for production". The maintenance departments and production department functioned in silos with almost no co-ordination amongst themselves. The most critical parts of the plant were not maintained for a long time.

The chairman called you after the meeting and asked you to help him understand the current issue at the plant. “We had Total Quality Management (TQM) in place at all our plants. I understand from the production director that TQM is working as intended. Why are we facing the breakdown problem inspite of having a TQM in place”- said the Chairman.

**Required**

The Chairman has asked you to quickly prepare a note highlighting the following points -

(i) What could be the likely losses arising due to breakdown of machinery due to non-maintenance?

(ii) What kind of maintenance programme could address the issue being faced by the company?

(iii) **EXPLAIN** the key features of such programme.

(iv) **COMPARE** the programme identified above and TQM.

(v) What are the various types of maintenance practices that the company can implement?

**Solution**

**Issue**

Super Refineries Limited has implemented a Total Quality Management and is known for producing top quality products. The company enjoys 40% market share in the domestic market. The plants operate at 100% capacity and on all days of the year. This indicates that the company does not carry out preventive and corrective maintenance. The company has not received any complaints with respect to quality from its customers. This can be attributed a solid TQM in place.
However, in the last three months, the company has faced delayed in supplies and customer rejections. The delay in supplies could be attributed to the breakdown in the machineries. The production could have been of an inferior quality if the production managers would have rushed to meet the production deadlines due to loss of production time owing to breakdown.

The discussions at the board meeting indicate that the company has not prioritized preventive maintenance. Maintenance is being carried out on an ad-hoc basis with a proper preventive maintenance schedule. The company is concerned about costs of maintenance and hence no preventive maintenance was carried out. Further, there is no co-ordination between the production team and maintenance team.

**Losses Arising Due to Breakdown**

The following are the losses which can be associated with the breakdown of machinery at Super Refineries Limited -

- Equipment failure leading to unexpected loss of time - The production at plants was interrupted and the supplies to customers were delayed in case of Super Refinery Limited.
- Idle waits and stoppages due to ad hoc maintenance requirements. Since the interruption is unplanned, the productive labour time is wasted.
- Production of inferior quality products causes financial losses. The company would also incur additional costs to remake the product without any additional revenues.
- The company would also incur losses in terms of additional set up costs. Every time a machine breaks down, a significant amount of time would be wasted in setting up the production processes again.

**Total Productive Maintenance (TPM)**

Based on the facts of the case, it is very clear that the company has not prioritised maintenance. The company can use TPM philosophy to address the issue.

TPM is a maintenance philosophy aimed at eliminating production losses due to faulty equipment. The objective of TPM is to keep equipments (plant, machinery etc) in such a position to produce expected quality products at the maximum capacity with no unscheduled stops. This also includes attaining:

- Zero breakdowns.
- Zero downtimes.
- Zero failures attributed to poor condition of equipment.
- No loss of efficiency or production capacity due to the equipment.

The concept was initially applied to equipment i.e., plant and machinery. Of late, the concept has also been extended to processes and employees. TPM focusses in keeping equipment and employees in top working condition to avoid any breakdowns and delays in manufacturing process.

Traditionally, maintenance work has been considered as a responsibility of the Maintenance Team which is different from the production team. Total Productive Maintenance seeks to involve workers in all departments and levels in ensuring the effective operations of the plant. When both
the teams work in alignment, learnings can be shared with each other. The production team also
takes ownership of maintenance requirement. A sole focus on higher production without taking
care of maintenance requirement can hamper the long-term production requirements, as could
be seen in the case of Super Refinery Limited.

Features

- Traditional maintenance is centred in the maintenance department. However, TPM seeks to
  involve workers at all departments and levels. There is a great amount of co-ordination
  between the production and maintenance team in TPM.
- Autonomous maintenance focusses on training operators to be able to take care of minor
  maintenance tasks. This relieves specialised maintenance staff to focus on critical issues.
- TPM focusses on achieving and sustaining zero loses with respect to minor stops,
  measurement and adjustments, defects, and unavoidable downtimes.
- Planned Maintenance is aimed to have trouble free machines and equipment producing
  defect free products for total customer satisfaction. The approach here is proactive
  maintenance instead of reactive maintenance. Super Refinery limited had a reactive
  approach to maintenance where maintenance was carried out on an ad hoc basis.
- TPM emphasises on training of workers across all levels and departments. The ultimate
  objective is to have a factory full of skilled workers.

The issues faced by Super Refinery Limited due to unplanned shutdowns can be addressed using
a Total Productive Maintenance philosophy.

The following are the Eight Pillars or Principles of TPM -

- Autonomous Maintenance
- Focused Improvement
- Planned Maintenance
- Early Equipment Management
- Quality Maintenance
- Education and Training
- Office TPM
- Safety, Health and Environment

TQM and TPM

Total Quality Management (TQM) and Total Productive Maintenance are often used
interchangeably. However, TQM and TPM are considered as two different approaches. TQM
attempts to increase the quality of goods, services and concomitant customer satisfaction by
raising awareness of quality concerns across the organisation. In other words, TQM focuses on
the quality of the product, while TPM focuses on the equipment used to produce the products. By
preventing equipment break-down, improving the quality of the equipment and by standardising
the equipment, the quality of the products increases. TQM and TPM can both result in an increase
of quality. However, the approach of each is different. TPM can be seen as a way to help achieving
the goal of TQM.
Super Refinery Limited has implemented TQM and is delivering high quality products to its customers. TQM focuses on the end product being supplied to the customer. In the process of producing high quality and volumes of products, the maintenance aspect of plant and machinery was ignored by all. This led to breakdowns and unplanned shutdown of the plant and machineries. The TPM philosophy would focus on the equipment which support production of high quality products under TQM.

**Types of Maintenance under TPM**

The following are the types of Maintenance Programmes which Super Refineries Limited can implement-

*Breakdown Maintenance*

No maintenance is carried out unless the equipment actually fails. This is the approach taken by Super Refineries Limited currently. This type of maintenance is used when the equipment failure does not impact the operations and production significantly and the only cost incurred is the cost of repair. This is not advisable in case of Super Refineries as breakdown of machineries have led to significant delays in deliveries and poor quality of production.

*Preventive Maintenance*

It is a daily maintenance (cleaning, inspection, oiling and re-tightening), designed to retain the healthy condition of equipment and prevent failure through the prevention of deterioration, periodic inspection or equipment condition diagnosis, to measure deterioration. This can be compared with a routine and periodic maintenance activity of a vehicle.

*Corrective Maintenance*

Corrective maintenance focusses on making machines easier to clean and maintain. There could be reconfiguration of certain parts of the machines (say, a lubricating pipe) to ensure that the maintenance staff can carry out maintenance effectively and easily.

*Maintenance Prevention*

Through the analysis of maintenance data, the maintenance technicians can work with the designers of our machines to create machines that are more reliable. Maintenance and repairs that are required can be made as simple and as easy as possible to reduce time, save money and improve safety.

*Autonomous Maintenance*

In case of autonomous maintenance, minor and day to day repairs are carried out by the operators of plant themselves instead of waiting for technicians. Activities like lubricating, bolt tightening etc. are done along with minor repairs by the floor workers or operators. Maintenance team is called only when sophisticated and highly technical maintenance work is required. You may change the tires of your car on your own but to repair a puncture or wheel alignment, you visit a technician.
Conclusion
Super Refinery Limited should implement a TPM which would complement and support the TQM philosophy. This would also address the issue of the production team and maintenance team not working in co-ordination. Down time for maintenance should not be considered as a cost or unproductive activity. This should be an integral part of the overall manufacturing plan. This would ensure that emergency and unplanned downtime are kept to a minimum.

CS-7: ETHICAL AND NON-FINANCIAL CONSIDERATIONS

Star Limited is in the business of manufacturing copper rods. The copper rods are sold to various cable wires manufacturers across the country. The growth in economy, especially the power sector, has led to a sharp increase in demand of cable wires and copper rods. The company is considering an opportunity to set up its own copper wire manufacturing plant and gain a share of cable wire’s market. A detailed study was carried out to understand the market of cable wires, market growth, competitive landscape, financial feasibility etc. The Chairman has asked the Director of Finance to review the financial feasibility study and highlight concerns, if any.

The following paragraphs contain summarised information of financial study carried out:

- The project of setting up a new cable wire manufacturing plant is expected to yield a Net Present Value of ₹200 crores considering a project life of 20 years. The initial cost of setting up the plant is ₹500 crores which is readily available with the company. The project would yield an IRR of 17.5% which is higher than the IRR of other plants under operation.
- The plant would employ about 70% of labour on contractual basis. These labours would mostly comprise immigrants from neighbouring countries. The feasibility study has assumed that the immigrants labours would be paid 15% less wage than that paid to other workers. However, the wage paid to immigrants would still be higher than the minimum wage requirements. The contribution to retirement funds is also not considered in the project evaluation. The company feels that immigrant workers would not stay beyond a period of a year and thus there is no requirement to contribute to retirement funds.
- The existing plants of the company do not have free space available and hence the company will need to buy land adjacent to its existing plant. A part of the proposed land to be acquired falls under the forest reserve area where no commercial activity is allowed. The company officials are in liaison with the government officials to get the land parcel approved. A certain amount of the value of land would be paid to certain government officials through a consultant. This cost is not a part of the project evaluation report.
- The new plant would also produce certain chemically harmful waste which would be disposed off into a nearby river after treatment. The company however does not have any technology to treat the waste fully. A new treatment plant would cost about ₹100 crores.

The finance director has forwarded the entire report to you for comments.
**Required**

(i) LIST Various non-financial and ethical consideration in decision making.

(ii) EVALUATE the impact of the various issues in the financial study and give your RECOMMENDATION.

**Solution**

**Issue**

Star Limited manufactures copper rods and is considering commencing a new plant for manufacturing of cable wire. A financial evaluation has been carried out and the project appears to be financially viable. The project has a positive NPV of ₹200 crores and an IRR of 17.5%. Though the project is financial viable, there are certain concerns relating to the project.

**Non-Financial and Ethical Consideration in Decision Making**

Capital Budgeting or Investments decisions are generally made based on the various financial evaluation like Net Present Value, Internal Rate of Return, Payback Period etc. The financial considerations in capital budgeting decisions are important because the end objective of every for-profit business is maximisation of shareholders wealth. However, an important aspect of capital budgeting is that investment decisions cannot be purely based on financial analysis; there are other soft non-financial aspects of the investment appraisal that need to be thoroughly looked into. Some of the non-financial considerations that a company factors for capital budgeting or investment decisions are listed below:

**Environmental Factors**

Environmental factors like pollution, deforestation, impact on climate and weather, greenhouse effects etc. must be considered by companies while selecting a project for implementation. Any project which adversely affects the environment is not taken positively by common public and environmentalists. A lot of projects have been stalled or delayed due to the protests by pro-environment groups leading to cost and time overrun. The government through ministry of environment could impose penalties on projects which are violating environmental norms or green norms.

**Staff Motivation**

Staff motivation and satisfaction is another important factor which companies might consider while choosing projects. If, for example, a company decides to implement automation in its plants for operations which would result in redundancy in labour, the overall staff motivation would come down. Staff and workers would resort to strikes and lockouts to protest against such decisions. The company should adopt a participative approach while taking such decisions considering the impact it would have on the labours.

**Government Regulations**

The companies must comply with relevant government regulations while implementing projects. Some projects might be profitable and yield excellent returns. However, if the profits and cashflows are generated by violating government regulations, it could be harmful in the longer
run for the company and its brand. The companies must ensure that all relevant laws and regulations are complied with.

**Availability of Resources**

The evaluation of any project must also consider availability of key resources like raw material, manpower, logistics infrastructure, electricity etc. If there is any constraint on any of the key resources at a future date, a financially viable and excellent project could well turn into a failed project. It is thus important that the requirements and availability of key resources are analysed in advance.

**Availability of Project Site**

Site selection involves measuring the needs of a new project against the merits of potential locations. This indicates the practice of new facility location, keeping in mind project requirements. A wrong or unsuitable project location may mar the very benefits of a financially lucrative investment proposal.

**Corporate Social Responsibility**

Corporate social responsibility refers to "the ethical principle that an organisation should be responsible for how its behaviour might affect society and the environment". The companies do not function in silos but are a part of the larger society and environment. They have a responsibility towards the society and environment to use the various resources judiciously and ensure a sustainable development. Companies are expected to uplift the well being of the society at large and to not harm the environment through operations. The aspects of corporate social responsibility must also be considered while deciding the project to be implemented.

**Ethics**

Ethics are a set of guiding moral principles for individuals and corporates. Every company has a duty of care to various stakeholders (shareholders, employees, suppliers, customers etc.). A company is expected to act in a fair and transparent manner and be honest in all its dealings with stakeholders.

**Issues in the Financial Study**

As discussed earlier, the project is financial viable with a very good NPV and IRR. The amount required to build the plant is also available with the company. Financially, the project must be accepted. However, there are certain non-financial issues which must be addressed before a decision to build the plant is taken.

**Payment to Labour and Ethics**

As explained earlier, every company has a duty of care to all its stakeholders and the stakeholders must be treated fairly. Labours are a key stakeholder for the construction and running of the plant. The company has chosen to pay 15% lower wage to immigrant workers and not contribute anything towards their retirement benefits.
The company is paying a higher wage to the labours than required by law and hence there is nothing illegal in such payments. However, the company must not discriminate between workers who are doing same nature of work just because the workers are immigrants. The reputation of the company might be affected because of the lower wages paid to immigrants. There is a possibility that these labours go on protests and strikes or decide not to work for the company.

The company has also decided not to contribute to retirement funds for these workers. This could have a legal implication as well. The financial impact of paying wages at par with other workers and contributing to the retirement fund for immigrant workers is not known. However, the company should reconsider this decision and pay all the workers the same level of wages. The company should also contribute to the retirement fund of employees.

**Availability of land and bribery**

The existing plant does not have sufficient space to build a new plant and hence the company is planning to acquire additional land which falls under the forest reserve area where no commercial activity is allowed. The company is in liaison with government officials to get the land acquisition approved. The company would also be paying bribes indirectly to the government officials to get the land allotment approved.

The payment of bribes to government officials, whether directly or indirectly would be unethical. The company could face litigation for acquiring land by unfair means and in future, there is a possibility of such allotments being cancelled. The company’s reputation would also be dented if news of bribery is published by the media. The company also has a responsibility towards the environment and must contribute towards a sustainable development. The society at large would not take acquisition of forest land by unfair means positively. This impact the overall goodwill and brand image of the company.

The company must evaluate if land at other sites can be acquired for construction of the plant. Such acquisition would be at a higher cost but would be beneficial to the company in the longer run.

**Chemical waste and technology**

The proposed plant is likely to emit chemically harmful waste which would pollute the environment. The technology available with the company can treat such waste partially. The company has to incur an additional cost of ₹100 crores to build a new treatment plant. This means that the NPV of the project would be reduced by ₹100 crores and IRR would also be lesser if the new treatment plant is built.

As discussed earlier, the company must operate in a socially responsible manner and consider implication of its action on the environment. The pollution caused by plants affects the surrounding environment and might lead to protests by local residents. Sometimes such protests are backed by NGOs as well. The commissioning of environmentally sensitive projects is difficult at times and can cause project delays as well.

The company should consider acquiring a new chemical waste treatment plant to ensure that there is no discharge of harmful waste from the company’s plant. Though, there is an additional
cost involved in building a new plant, it is important that the society at large perceives that the company is operating in a socially responsible manner. The company operates in a society and is an integral part of it and hence, it has certain responsibilities towards the society as well.

Conclusion
The ultimate objective of a company is to maximise shareholders wealth. The company must, however, operate in a socially responsible manner in achieving the objective of wealth maximisation. The company has a duty of care to other stakeholders like employees, society at large etc. In some cases, there may be conflict between different stakeholder’s objectives. For instance, a new waste treatment plant would be good for the environment and society at large but would be adverse for shareholders as an additional cost of ₹100 crores would be incurred. The company must definitely consider non-financial factors along with financial factors while deciding on whether to build a new plant or not.

CS-8: VALUE CHAIN ANALYSIS

S-Mart was founded in 1990 as a departmental store catering to the entire household requirements (from grocery to clothing) of middle income groups. The company since has grown leaps and bounds and inaugurated its 100th store in 2017. S-Mart is known for high quality products which are available at discount to the market price at its store. The company claims to give at least 5% discount on listed price across product segments. The sales of company have grown 30% on Y-o-Y basis. The company has highest net profit margin and highest return on equity in the industry.

S-Mart has tie-ups with more than 500 vendors across India who provide high quality products on demand. S-Mart pays all its suppliers in advance and hence enjoys preferential pricing as compared to its competitors. The company procures products using the Just-In-Time (JIT) philosophy which helps it to keep low level of inventories and thereby freeing up significant amount of working capital. The products are directly delivered to the stores by company owned trucks and mini-vans and hence, there is no requirement of warehouses to store products.

The company sells products which are required by households on a day to day basis and is not keen to sell premium products which have higher margin but lower demand. This ensures that inventory is moved out of the stores faster and increases the inventory turnover ratio. The company owns all the stores which it operates under its brand name.

There is no third-party franchisee appointed to operate the stores. Since the products are directly procured from manufacturers and sold to customers, there are no intermediaries in between.

S-Mart invests in superior quality products and high level of customer services than aggressive marketing. The company believes that it can attract more customers by offering quality products at reasonable prices rather than spend huge amount on marketing. However, need based marketing activities are carried out by the company. S-Mart aims to build customer loyalty through high level of customer service at its store.
S-Mart is one of the few companies which has witnessed a low employee turnover in the industry in which it operates. The motivation level of employees are very high which results in excellent performance across all levels. Company rewards its employees generously through employee stock options plan. The company conducts training sessions for its employees periodically to equip them with latest techniques in areas of procurement, sales, marketing and customer service. The result of these efforts is clearly visible in the company’s growth.  

The company has a solid Information Technology infrastructure for all its activities. The company has leveraged technology across all departments - be it procurement, logistics or sales. It has implemented SAP-R3 which is one of the leading Enterprise Resource Planning system globally. Various reports relating to inventory levels, sales, liquidity position etc. are available on a real-time basis to the senior management.  

**Requirement**

Map the various activities performed at S-mart to the Porter’s Value Chain model.  

**Solution**

**Introduction**

Value chain is defined as “a chain of value added activities; products pass through the activities in a chain, gaining value at each stage”. Value chain focuses on systems, and how business inputs are changed into business outputs purchased by customers. The entire set of activities that a business undertakes to covert inputs to outputs are interlinked to each other. A business carries out these activities to earn a profit or margin.  

A business should undertake only those activities which add value to the end product being delivered to the customer. A value chain analysis helps business identify those activities which are not adding value (in other words wasteful activities). An example of a wasteful activity could be unnecessary storage of products which increases the inventory and working capital requirement. Such activities must be removed to ensure that the margin of business improves. Value Chain Analysis is one way of identifying which activities are best undertaken by a business and which are best outsourced.  

 Porter’s value chain classifies activities into primary activity and secondary activity.  

**Primary Activities**

Primary activities are those activities that are directly related with creating and delivering a product to the end customers. The following activities are considered as primary activities:  

**Inbound Logistics**

Inbound logistics involves arranging inbound movement of materials or finished goods from suppliers to the manufacturing plants or retail stores. Since S-Mart is not involved in manufacturing, all the activities that it undertakes to deliver the products to its retail stores would form part of Inbound Logistics. The company has its own transport fleet to ensure timely delivery of products to the retail stores. The company also has a JIT system in place which ensures
minimum inventory level. A reason why the company uses its own fleet of trucks is to ensure that there are no failures on the supply side. In JIT systems and especially in retail business, it is very important that stock outs are avoided.

**Operations**

Operations involve those activities which are concerned with conversion of input into outputs in case of manufacturing companies. In retail business, it comprises of those activities which are concerned with running of stores, planning of inventory levels of various products, deciding the layout of various stores etc. The company operates through 100 stores which are owned by itself. The company does not have franchisee or agent model for operation of its stores. The ownership of the stores ensure that the quality standards are maintained across various stores and customer get the best value. Since the stores are owned, the company does not face any risk of closing the stores due to expiry of lease arrangements. The company can also invest to build the best layout for the stores.

**Outbound Logistics**

These include planning and dispatch, distribution management, transportation, warehousing, and order fulfilment. In case of a retail business, this includes activities carried out to deliver the product to the customer. S-Mart operates through its own stores and there are no outsourcing or franchisee arrangements. The company does not have any warehousing requirement as the product are directly delivered to the retail stores. The customers directly pick up the products from the stores and there is no transport requirement in this case. The company must however ensure that the customer waiting time is low at the time of invoicing and checkout from the store.

**Marketing & Sales**

Marketing and sales are the means whereby consumers and customers are made aware of the product which is ultimately sold to them. The activities include selling products to the end customers covering activities like product management, price management, promotion and marketing management. S-Mart builds customer loyalty by offering high quality products at affordable pricing. The company does not spend a huge amount on marketing.

**Service**

In case of manufacturing industry, service generally refers to the after sales service which are required to maintain the value of product and includes activities like installation, repair etc. In case of retail stores, service would encompass a superior experience at the stores and managing return of products by the customers. S-Mart aims to build customer loyalty through high level of customer service at its store.

**Secondary Activities**

Secondary activities are those activities which support the primary activities in their function. The following are the broad classification of secondary activities:
Procurement

Procurement refers to the processes of acquiring various products and include activities like identifying sources of these products, vendor selection, placing an order, purchase of products etc.

The company deals with over 500 vendors across India on advance payment terms to procure high quality products at preferential pricing. This helps the company get better discounts which it can pass it onto the customers. This ensures that the company does not carry the burden of discounts being offered to the customers.

Technology Development

Technology spans across all the primary activities of an organisation. It includes activities like process automation, an Enterprise Resource Planning (ERP) system, inventory management systems etc. The company has implemented SAP R/3 - an ERP package which helps in the management of various functions of procurement, logistics and sales. A robust system is always necessary to ensure that the JIT systems work effectively. Such systems assist in real-time monitoring of inventory levels and triggering purchase orders when inventory levels are low. The entire flow of products from an order placement till the delivery to customer can be tracked seamlessly.

Human Resource Management

This involves areas of recruiting, managing, training, developing and rewarding people within an organisation. S- Mart has a very low employee turnover and a very high level of employee motivation. The company rewards all its employees generously and conducts periodic training and development programmes for its employees. This ensures that the employees are highly motivated which translates into a consistently high performance.

Infrastructure

This includes not only the physical infrastructure but also all departments of management, finance, legal which are required to keep the company’s store operational. All these are important for organisation’s performance in primary activities.

CS-9: 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:
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.

**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.
13.40 STRATEGIC COST MANAGEMENT AND PERFORMANCE EVALUATION

- 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:

<table>
<thead>
<tr>
<th>Activity</th>
<th>Cost Drivers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planting of trees</td>
<td>Number of trees planted</td>
</tr>
<tr>
<td>Treatment of nitrogen oxide <em>(in the same way, activity and related cost driver for other gases would be determined)</em></td>
<td>Volume of nitrogen oxide treated</td>
</tr>
<tr>
<td>Solid waste removal</td>
<td>Volume of such waste</td>
</tr>
<tr>
<td>Research and development activities</td>
<td>Man hours worked for such activities</td>
</tr>
</tbody>
</table>

**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 a 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 workforce 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.