

Final Course
(Revised Scheme of Education and Training)
Study Material
(Modules 1 to 3)

PAPER 5

**Strategic Cost Management
and Performance Evaluation**

[Case Study]

Module – 3



BOARD OF STUDIES
THE INSTITUTE OF CHARTERED ACCOUNTANTS OF INDIA

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BEFORE WE BEGIN....

Strategic issues are increasingly becoming important, cost management has changed from a traditional role of product costing and operational control to a border, where cost leadership and performance management is vital. In this scenario managing costs strategically and monitoring and controlling performance is crucial for the long-term sustainability of organisations. This study material combines the strategic cost management techniques, with the performance based management framework in one integrated system.

Under the Revised Scheme of Education and Training, at the Final Level, you are expected to not only to *apply* various strategic cost management tools and techniques but also to *analyze* and *evaluate* the issues. The process of learning helps you inculcate the requisite professional skills, necessary for achieving the desired professional competence.

This Study Material is divided into three modules for ease of handling by the students. Module 1 contains Chapters 1-7, Module 2 contains Chapters 8-12 and Module 3 contains Chapter-13. The content for each chapter at the Final level has been structured in the following manner–

- (i) **Learning Outcomes** – Learning outcomes which you need to demonstrate after learning each topic have been detailed in the first page of each chapter. Demonstration of these learning outcomes would help you to achieve the desired level of technical competence.
- (ii) **Chapter Overview** – As the name suggests, this chart/ table would give a broad framework of the contents covered in the chapter.
- (iii) **Content** – Study Material lays greater emphasis on analysis and interpretation of information from the perspective of decision usefulness.
- (iv) **Illustrations and Case Scenarios** have been included in the Study Material systematically, after discussion on each topic, so that application of the concept can be understood very clearly. This would also enable you to learn and sharpen your application skills and test your understanding. Case Scenarios are woven into the text to go beyond the numbers and think critically.
- (v) **Case Studies** based on real-world situations are designed to assess a wider range of skills and integrated learning across the syllabus.

(vi) Let us Recapitulate – A summary of the chapter is given at the end to help you revise what you have learnt. It would especially help you to revise the chapter(s) quickly the day before the examination.

Every effort has been made to make the Study Material error free, however if inadvertently any error is present and found by readers they may send it to us immediately, so that it can be rectified at our end.

In case you need any further clarification/ guidance, you may send your queries at deepak.gupta@icai.in

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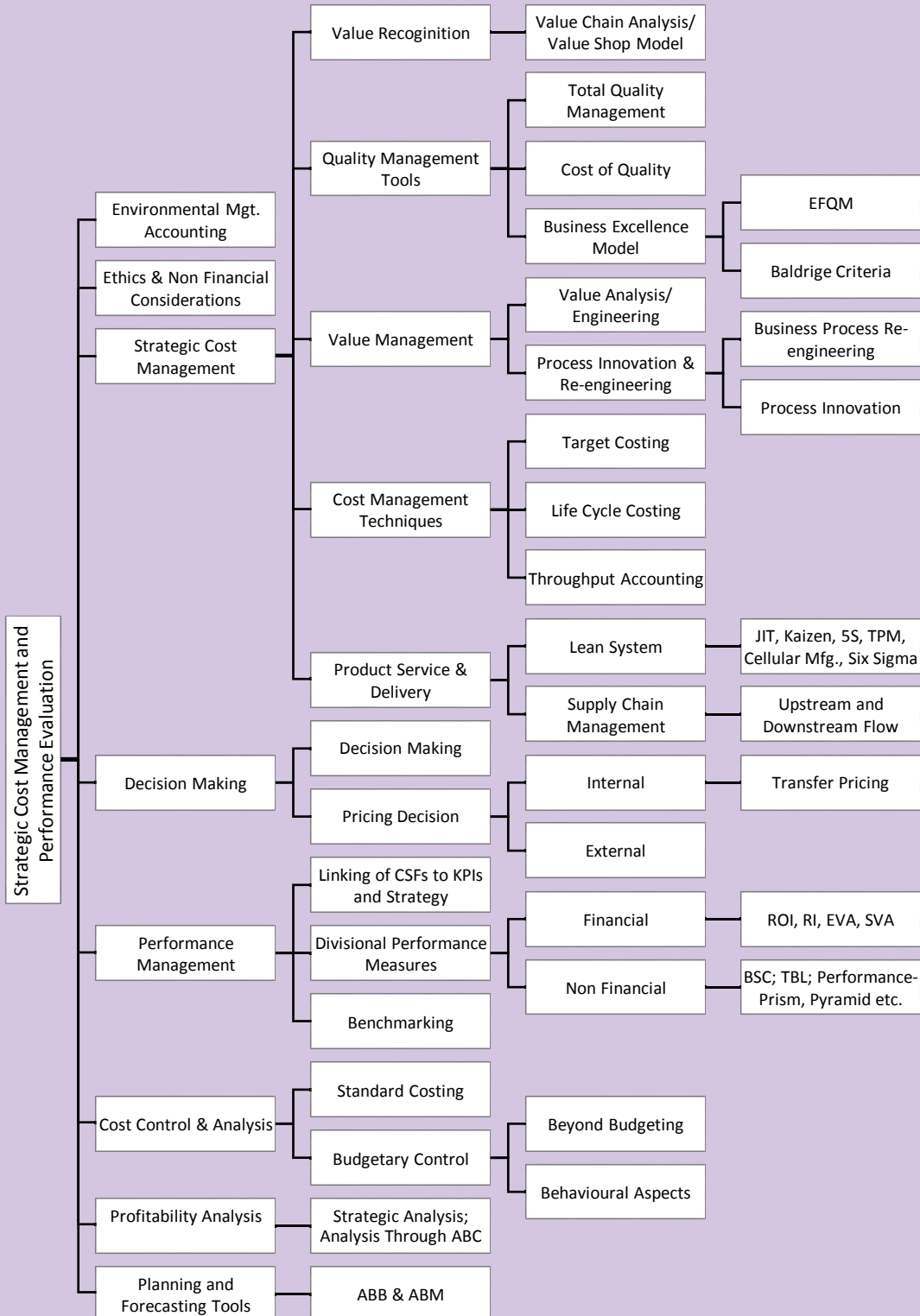
CASE STUDY



LEARNING OUTCOMES

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.





ESSENTIALS FOR CASE STUDY

Case Study is not about the quantity, but the quality.

Prepare a plan for each issue.

Decide what models to use and prioritize the issues.

Identify the impact and alternative actions that could be taken, as well as the relevant concepts and calculations required.

Answer should have a logical flow.

Offer a detailed analysis of the issues and conclude with sound, well justified recommendations.

Not to spend too much time on calculations.

Do not place too much attention and time on the presentation.

Quality of discussion on each issue which is most important, not the ranking order.

Discuss each of the issues in depth, explaining their impact.

Do not leave any of the issue undecided.

Recommendations should include 'what to do', 'why to do it' and 'how to do it'.

Identify ethical issues and then briefly justify.

Recommendation should appear at the end of the report.

Practice makes perfect.

**CS-1: Value Chain Analysis, Balanced Scorecard, KPI**

You are the Finance Manager of **DP Limited** which is in the business of manufacturing wire rods. A division in the company manufactures copper wire rods from a single manufacturing plant in Central India. The division purchases raw material (copper cathodes) from various suppliers across the country. The cathodes are melted and wire rods of various dimensions are produced. Each batch of wire rods produced are tested for quality and strength.

The wire rods are stored in rolls in the warehouse and dispatched in company owned trucks as per the requirement of the customers. The customers are required to pay 50% of invoice value as advance and balance 50% within 30 days of delivery of goods. The company prices its copper wire rods based on the price prevailing on London Metal Exchange after adjusting it with a factor to cover conversion costs and profits.

The company explores newer markets by advertising in national dailies and participating in various industrial events in India as well as abroad. An annual conference of customers is conducted by the company to improve customer relationships and attract newer customers. The customers have right to return the material if quality specifications are not met. There is a separate team to handle such complaints.

The following email was sent by the Chief Financial Officer of the company to you.

From: Chief Financial Officer

To: Finance Manager

Subject – Commodity Price Fluctuation

The board is quite aware of foreign exchange fluctuation related risks. However, they are not much aware of risks related to fluctuation in commodity prices. The prices of copper which are used to manufacture copper wire rods have fallen down by over 20% in the last six months owing to global factors.

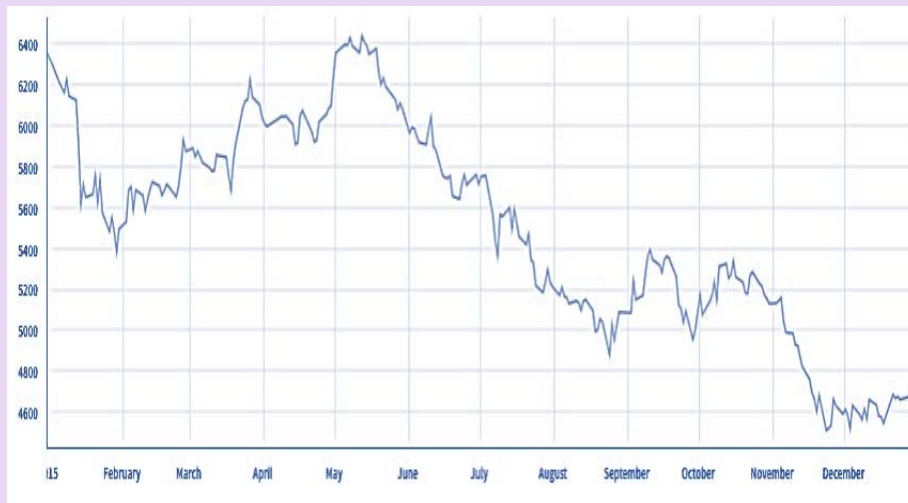
The procurement team of Copper Wire Division has been waiting for the right time to buy these metals as they expect the prices to fall down further. However, we are at a verge of stock-out of these metals as no purchase was made in the last one month.

The bonus of procurement team largely depends on the annual savings as compared to the budgeted cost of purchase. I am not happy with the approach of speculation and making profits out of price fluctuation in raw materials. Could you highlight the issues related with our performance measurement mechanism and suggest how it could be improved?

**Regards,
Chief Financial Officer**

Attachment:

Copper Prices Quoted on LME



Required

- (i) EXPLAIN and IDENTIFY the various primary activities of Copper Division.
- (ii) DISCUSS the issues with performance measure in force in the company.
- (iii) ADVISE an alternate performance measure and Identify Key Performance Indicators (KPI).

Solution

- (i) 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 convert inputs to outputs are interlinked to each other.

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 from suppliers to the manufacturing plants. The activities related to inbound logistics in the case of copper division of DP limited would involve transporting copper cathodes from multiple suppliers across the country and storing them in the warehouse. The cathodes stored in warehouse would be issued to the production facilities depending on the requirement of the production plants.

Operations

Operations involve those activities which are concerned with conversion of input into outputs in case of manufacturing companies. The activities under operations would include those related to melting of copper cathode and converting the copper cathodes into wire rods. The quality tests carried out for wire rods would also be included as a part of operations.

Outbound Logistics

These include planning and despatch, distribution management, transportation, warehousing, and order fulfilment. This includes warehousing of finished goods (copper wire rods) and distribution of copper wire rods to its customers. The company uses its own trucks to distribute finished goods to its customers. The scheduling of trucks and dispatch of material would also be a part of outbound logistics.

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. DP limited uses advertisement in national dailies and holds conferences as a part of its marketing and sales efforts. The company also holds annual customer conference to improve customer relations and attract new customers.

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. The service team is also expected to handle customer returns on account of poor quality of copper wire rods.

(ii) What is the issue?

A procurement team is generally a cost centre and the most appropriate way to evaluate performance of cost centre is the comparison between actual cost and budgeted cost (also called variance). A large portion of bonus (performance measurement) is dependent on the savings in actual purchases.

The company has adopted variance analysis as a measure of performance. If the team is able to reduce the actual cost of purchase as compared to the budgeted cost, a higher bonus is paid. The procurement team has stopped purchase of copper cathodes to save on the purchase budget which ultimately would translate into higher pay-out of bonus.

The commodity prices of copper have fallen by about 20% in the last six months. The speculation of fall in price has resulted in halting of procurement process. It is very difficult to time the market and such speculation could lead to losses to the company. There could be a stock-out situation if the procurement is not resumed and the situation could hamper the production and overall delivery schedules.

The procurement team appears to have taken a short-term view of price movement. The team is focused on earning higher bonus and hence is waiting to buy at lower prices. There is a larger impact of not being able to deliver product on time which could damage the reputation of the company. This has been ignored by the procurement team. Managers must be encouraged to consider the impact on the company as a whole and not on just the own department.

The company is using just a financial measure to measure performance. This can result in lopsided view of the goals and objectives of the company. Managers tend to look at short term profits and ignore the long-term growth.

Optimum Performance Measurement

A performance measurement is most effective when the goals of the respective departments are aligned with that of the company. This ensures that each employee within the company works towards the overall objective of the company. The company manufactures wire rods and the objective of the copper division is to manufacture copper wire rods as per the requirement of the customers.

The profit flows from the main business of the company. If a department focusses on an objective which is not aligned with the main goal, the company as a whole suffers. A stock-out like situation would hamper the image of a company, if wire rods are not delivered as per schedule to the customers.

Another aspect to be considered is that managers and employees are evaluated only on those parameters which are controlled by them. If for example, the procurement team is able to purchase copper at a discount to market price because of their efforts, it could be considered as saving.

The prices of copper are determined by the prices on commodity exchanges and are not in the control of procurement managers. The performance of managers and employees should not be impacted by global change in prices of commodities as they are not controlled by the concerned employees.

(iii) Alternate Performance Measure

The issue with financial performance measures alone is that managers tend to have a short-term view as can be seen in our case. In order to overcome possible short-termism of financial measures Kaplan and Norton developed the Balanced Scorecard which outlined 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. The four perspectives used to measure performance in a Balanced Scorecard is given below:

Financial Perspective: This measures the financial performance which is linked to the overall objective of maximising shareholder's wealth. We already use financial measures to measure performance. The weightage could be reduced to include other measures. Also, factors beyond the control of managers like commodity prices should be excluded.

Customer Perspective: This includes focussing on customers and meeting their needs. Measures could include quality of material produced, optimum levels of inventory maintained, number of stock-out instances, etc.

Internal Business Perspective: This includes measures to evaluate the performance of business processes with particular emphasis on productivity and efficiency. Measures could include procurement lead time, number of defective purchases etc. The company could use measures like JIT to reduce the procurement lead time.

Training and Growth: This includes focusing on innovating in processes and developing and learning for the future. Trainings could be given to procurement managers to identify best quality of copper cathodes, aspects related to purity etc.



CS-2: 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 the 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.

Required

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 convert 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-3: PORTER'S VALUE CHAIN MODEL VS. VALUE SHOP MODEL

Westwood Solar Solutions (WSS) has mastered the art of developing Solar Domestic Water Heater that fulfil customer's needs. WSS's designers and product developers focus on solutions to get rid of everyday hassles and transform these into a pleasant experience. WSS also has a wide service network that spans the length and breadth of India to ensure good care of customers and products, by providing a prompt and pleasant service experience. In the past, WSS had a dominant position in the Indian market. However, over the past four years, it has been found that its profits and its share in the market have come down.

WSS has business Model comprising of following steps:

- Firstly, WSS's highly qualified and skilled experts visit customer's locations to identify and design the appropriate heater as per customer's requirements. WSS's experts are recognized as the best in the industry, and customers agree that they produce the most effective solutions to their complaints.

- At WSS, in the laboratories, the *heater* design goes through intricate, complex, and dynamic process. Prototypes are developed on the basis of discussions in previous step. Thereafter, these prototypes are tested. Once a final design is decided, such design is passed to the manufacturing division for production.
- Then, WSS manufactures appropriate *Solar Water Heater* to the desired specification and installs at the customer's location.
- After the *heater's* installation, WSS renders annual maintenance services for which it is well-known in the industry.

WSS's customers pay a total price for design, manufacture and initial installation of the *Solar Water Heater* and an annual maintenance charge after that. Total prices are quoted before design work begins.

Although customers appreciate the high quality of the solutions provided by WSS's team, however, they are complaining that the overall prices are too high. Customers have said that although other suppliers do not solve their problems as WSS does, they do charge less. Consequently, WSS has lower down its prices to compete in the market. There is a doubt that the manufacturing and installation stages of the business model are not contributing sufficiently to the firm since costs at both stages are going high.

Partners of WSS have considered that this situation should no longer continue and have recommended that a value chain analysis to be conducted as to identify the way forward for WSS. Although majority of partners are in the agreement with the proposed value chain analysis, however senior partner 'W' has stated that *value chain analysis is inappropriate idea*. She says that she has heard a number of criticisms of the value chain model.

Assuming yourself as management accountant of WSS, answer the following questions:

Required

- (i) DISCUSS the benefits that may accrue to WSS from conducting a value chain analysis.
- (ii) DISCUSS the criticisms of Porter's value chain model in the context of WSS
- (iii) EXPLAIN other form of Value Chain Analysis that may be more suitable for WSS.

Solution

- (i) There are following benefits accruing to WSS through a value chain analysis:
 - Value chain analysis is a process by which a firm identifies and analysis various activities that add value to the final product. The idea is to identify those activities which do not add value to the final product/service thereafter *eliminating such non-value adding activities*. The analysis of value chain help a firm in obtaining cost leadership or improve product differentiation. For WSS, value chain can provide with more unambiguous picture of the value of the manufacturing function as perceived by customers.
 - This model also helps in *analyzing other firms within the same industry*. As WSS observed that other firms in the industry are considered to be more cost effective in

terms of manufacturing, it may plan to use the value chain model to examine the reason for the same.

- The value chain will assist WSS to determine ways to get best approach towards developing *higher level competitive performance*. This model assists firms in finding ways to develop higher level of performance either by *cost leadership* or product *differentiation*. Right now, WSS is in a situation wherein it is being defeated on price by some of its competitors, however is recognized as the best solutions provider to customer's problems. Through detailed value chain analysis, WSS may be able to ascertain the reason of falling down in such situation and partners may be able to take decision regarding the future vision of the firm.
- Through this analysis, WSS may apply other relevant management techniques as well. Post value chain analysis, WSS will be in a position to decide whether it is worthwhile to continue the technique of benchmark (processes and performance) against its rivals, to develop an information systems strategy, to carry out a *business process re-engineering* process or to adopt activity-based management.

Further, WSS may decide to outsource manufacturing and keep focus on design and services by following value chain analysis model. This technique may be appropriate for WSS as by outsourcing manufacturing, WSS may be able to *focus on its core area* for which it is well-known in the industry.

- Value Chain analysis will also facilitate the development of performance metrics for WSS. By developing such metrics WSS may be able to identify which aspects of its business model are not contributing to the overall value and profits of the firm. Although currently WSS has suspicion that manufacturing and installation are the weak parts of its operation, development of transparent and appropriate metrics would enable WSS to recognize where value and profit are being added in the business model.

(ii) Number of criticisms of the value chain developed by Michael Porter have been:

- This value chain analysis cannot easily be applied to firms belonging to *service industries*. This criticism is particularly imperative in the context of WSS which has upward profits from rendering solutions and services rather than that from manufacturing tangibles products. Many people appreciate that the model is more suitable to manufacturing-based industries, rather than service based industries.
- Often this model is seen as complicated and perhaps could be a source of frustration for the management of a firm. Although the staff of WSS includes bright and intelligent experts, they may not see the value in-depth analyses of business which is required for a full value chain analysis.
- This analysis has a *linear approach and ignores the concept of value networks*. This criticism is specifically relevant to WSS because its major business resort to the *cooperative relationship* that the experts have with their customers. If, WSS decides to outsource manufacturing and focus on design and service, this will become even more relevant where relationships are utmost important.

- Often value chain analysis is perceived as time consuming and expensive as a whole. However, if the analysis is to be completed timely, there will be requirement of reliable data such as cost of components in business model. However, in the absence of good cost capturing system, this model could prove to be a costly process. After completion of this process, still there is no guarantee that the process lead to have upward trend in profitability and where it does, it may take some time in realization.

(iii) WSS requires to acknowledge that the nature of its business is turning from manufacturing zone to a solutions provider or professional services firm.

From this point of view, it would be better for WSS to analyze its business using the Professional Services Value Chain/ Value Shop Model. The concept of Value Shop came in to lime light holding the hand of Charles B. Stabell and Oystein D. Fjeldstad in 1998. This concept aims to serve firms from service sector. It only deals with problems, figure out the main area requiring service and finally come with the solution. This approach is designed to solve customer's problems rather than creating value by producing output from an input of raw materials.

A Value Shop mobilizes resources (say: people, knowledge or money) to solve specific problems such as delivering a solution to business problem. This shop model is iterative, involving repeatedly performing a generic set of activities until a solution is reached.

Secondary activities in the Professional Service Value Chain have same support activities as those in the porter's value chain, However the primary activities are described differently to recognize the different nature of a *service-oriented* business. In value shop, primary activities are performed in a circle within a firm to perform generic set of activities iteratively before reaching a conclusion. Since WSS team communicate with customers to find a solution before testing of developed prototypes, so they will find the vale shop, compatible and effective model to use.



CS-4: PORTER'S FIVE FORCES & DIVISIONAL TRANSFER PRICING

In the 'Five Forces Model', one of the crux is that companies or divisions compete with their buyers and suppliers. The same model can be used to evaluate the competitive environment of the divisions of large, complex companies. In such companies, some of the divisions may be buyer and supplier to one another. This leads to management accountants becoming involved in negotiations leading to the agreement of suitable transfer prices between these divisions.

Required

- (i) EXPLAIN, how the forces applied in a relationship between supplier and buyer led Michael Porter to reach a conclusion that companies compete with their buyers and suppliers.
- (ii) DISCUSS, the issues of negotiating and agreeing transfer prices between divisions within a large, complex organization. Make references to Michael Porter's model, and your arguments in part (i) where appropriate.

Solution

- (i) Michael Porter concluded that companies or divisions compete with their buyers and suppliers because they exercise bargaining power over one another. The relative *competitive advantage* is determined by the degree of bargaining power of each of the parties. Porter viewed competition as activity that affects margins *where* buyers and suppliers struggle to steal margin from each other.

The competitive forces between buyer and supplier affect *price* and *quality*. A large order or **powerful buyer** will exercise force by trying to encourage the supplier to *improve quality*, either of the product or service being provided, or of the services supporting the product. As another option, a **powerful buyer** might be willing to accept the standard product, but *demands a discount*, thus increasing its own margin at the expense of the supplier.

Relative size of the parties also determines the bargaining power, or it also depend on the degree of reliance on one another. A large buyer or supplier, for whom the other party is a small or unimportant portion of business, is more likely to exercise power to get a "good deal". It is clear that a buyer placing a small order is in a worse position to ask for a discount than one placing a very large order. In the same way, if a buyer represents a major portion of turnover, a supplier will work hard to keep such a buyer happy, thus may increase the service package to support the product by incurring costs.

A buyer or supplier also has greater bargaining power if **switching costs** in doing business elsewhere is incurred by other party. This cost would, if incurred, reduce margins. This will lead to the party being less likely to break up the relationship with other party.

Some elements of the bargaining power are also determined by the **availability of alternative suppliers or buyers**. A large supplier will give no concessions to a very small buyer if it is confident that another buyer will be available to replace it. Similarly, a buyer looking for a very special material or service may find that it has no alternative than to accept the terms offered by a single supplier.

Thus, companies and divisions "compete" with their buyers and suppliers. However, this depends on how broad the definition of "competition" is. Michael Porter started from the premise of a very broad definition, consequently could prove his hypothesis.

- (ii) In a large and complex company, divisions may have been developed or acquired along a supply chain. This means that, within the company, there are divisions that are buyers and suppliers for each other. The logic behind establishing this structure is that it reduces transaction costs, cuts out supplier margins and secures reliable supply of raw materials or components. In this situation, the company faces the risk of sacrificing any saving in transaction costs if management needed to invest considerable time in transfer pricing negotiation.

In effect, the divisions concerned will be competing with one another like buyer and supplier during the negotiation, in the same way as described in Part (i). The transfer price agreed will affect, to some extent, the profitability of each of the divisions. If bonuses are paid to managers as per divisional performance, the transfer price will determine the level of bonus paid. Thus, managers may have a personal interest in enduring negotiations that will destroy value in the company.

The parent company must determine whether the transfer price is in the best interests of the company. If it is, it should simply be imposed. This finish off *competition* but may discourage managers, especially when divisional bonuses are paid. In most companies, some level of negotiation is allowed, but this may be not realistic if transfer is necessary. In this case, the bargaining power of the supplier division is vastly increased, thus destroy the balance of the negotiation.

The opposite is the case if the supplier division is not allowed to make external sales, or if there is no external market (for example, for a special component). In this situation, the bargaining power clearly lies with the buyer division, as the supplier has no choice but to make the transfer. However, if the special component or supply is not available from elsewhere, the bargaining power may shift to the supplier division as its product is of different nature.

The outcome of any transfer price negotiation must be ended in a transfer at a *fair price*. In this case, fair means that the price must be comprehended as fair by the division concerned. Any other outcome may lead to loss of motivation in one or both of the divisions. A fair price can be easily determined if there is a free market of the product, component or service being transferred (in other words, it can be both sold and bought outside). If this case does not exist, the range of transfer prices may fall between marginal cost of a unit and full cost plus normal margin.

In corporate terms, the most important transfer pricing issue is that while consolidating the accounts, the transfer price cease to exist. While consolidating the supplier and buyer division accounts, the revenue from the transfer price cancels out the cost of purchase, so the net result is that the transfer disappears. In entire development, most of time and efforts are wasted and simply rise in internal transaction costs. Accordingly, any *competition* between the divisions is worthless. If the management accountants comprehend this, and the relative bargaining power of the divisions concerned, it is possible to determine negotiations quickly, thus distorting as little value as possible.



CS-5: BUSINESS EXCELLENCE MODEL

As a guest lecturer at a symposium for Business Excellence where you are giving a lecture on "Sustaining Business Excellence". A manufacturer of a fashion clothing line is one of the participants at the symposium. He has the following query:

"We are an apparel company that manufacture and sell our fashion clothing and accessories directly through 30 stores spread across India. Shortly we are planning to establish similar outlets overseas. Our business is under constant change due to changing customer trends. At the same time, we are the largest company in our industry segment in India, both in terms of market share and profits. We have a satisfied base of customers who are loyal to our brand. Shareholders are also satisfied stakeholders due to good returns provided on their investments. What would be the relevance of Business Excellence model to our company?"

Thank you!"

You are required to frame an appropriate response to this query.

Required

- (i) EXPLAIN the importance of business excellence to an organization.
- (ii) LIST the tool available to achieve and sustain excellence.
- (iii) APPLY the fundamentals of EFQM model on the apparel company.
- (iv) EXPLAIN the relationship between various criteria of the model in general terms.

Solution

- (i) Business Excellence is a philosophy for developing and strengthening the management systems and processes of an organization to improve performance and create value for stakeholders. Stakeholders in an organization are not limited to shareholders (business) alone. They include also customers, employees (people) and society. What an organization does impact all the stakeholders in different ways, yet they are all interlinked to each other. Customers' needs are of paramount importance to companies. Yet given uncertain conditions, shareholders demand challenging return on their investments. Employees need more from their company than just their pay-check. They want the company to enable to grow their knowledge and experience that can improve their career growth. Society expects companies to operate ethically and for the overall betterment of the society and environment.

For several years businesses have been operating under challenging circumstances. For example, landline phones have been entirely replaced by mobile phones. Television programs can be watched seamlessly on internet enabled mobile phones. Not just this, today's smartphones have computing capability much more than the computers that were used in Apollo Mission to send the first man to moon! The proliferation of mobile phones has changed not just the telecom industry but also others like communication, banking, e-commerce etc. The pace of change is both exhilarating and challenging.

To manage this complex scenario, a company cannot focus on only one aspect of their operations. Optimize processes, delivery quality to customers, manage employee talents, earn required return on investment while managing to be a socially responsible organization. In short, the company should achieve excellence in all aspects of its operations. This is business excellence. Business excellence principles emerged because of development of quality drive into traditional business management. It is imperative not just to achieve excellence but also to sustain it.

Business excellence models are holistic tools that help companies develop stakeholder focused strategy. Each operation within a company enables a corresponding result. Business models present a formal, standardized cause effect relationship between different operations (enablers) and their resultant consequences. If the company want to achieve a different result, it has to do things differently. This can be better analysed through these models. Continuous improvement on various operations will ultimately lead to excellence. More importantly, these models need to be used to sustain and maintain excellence to retain

their competitive advantage. They are not to be taken as one time exercise by the company. Assessments using this model have to be made periodically so that timely action can be taken to achieve the desired result.

- (ii) Some of the popular business excellence models are (i) the European Foundation Quality Management (EFQM) model (ii) Baldrige Criteria for Performance Excellence (iii) Singapore BE Framework (iv) Japan Quality Award Model and (iv) Australian Business Excellence Framework.
- (iii) The apparel company is a well-established player in the industry. It is a growing company that is looking to expand its operations overseas. To achieve business excellence in this environment, the company could adopt the EFQM model, which is a popular model.

The EFQM model was developed by the European Foundation for Quality Management. The model provides an all-round view of the organization and it can be used to determine how different methods fit together and complement each other. It can help the company understand the cause and effect relationships between what their organization does and the results it achieves. Creating an EFQM Management Document gives the organization a holistic overview of its strategic goals, the key approaches it has adopted and the key results it has achieved.

The fundamental concepts for excellence are the basic principles that describe the essential foundation for any organization to achieve sustainable excellence. With respect to the company they can be detailed as below:

- (a) Adding value to customers: Companies need to understand their customers, their needs, anticipate their needs and make use of opportunities to fulfil their expectations.

In the current case, fashion apparel business is ever changing and dynamic due to the changing trends in customer's tastes. This could differ across locations within India and abroad. In the era of e-commerce, competition would be cut-throat. Before going to "how" it can meet customer's needs, the company should be clear on "what" need of the customer it can satisfy. For example, should the company cater to Indian apparel market, western apparel market, men or women or children apparel market etc. Once the "what" is clear, the company should have mechanisms in place to find out and anticipate customer tastes. Accordingly, it should structure its operations to add value to the customers in terms of quality, availability, support, and experience.

- (b) Creating a sustainable future: Society and environment (People and Planet of Triple Bottom-line concept) play a major role in ensuring the sustainability of business. A company should have as much positive impact on its surroundings and try to minimize any negative impact on the same. Here, the company should assess the environmental impact of its operations, measures to minimize adverse impacts, business impact on the society etc. For example, leather is contended to be harmful to the environment since it requires the skin of animals specially cattle hide, needs huge amount of energy and chemicals to process it. This has a negative environmental impact. As regards societal impact, suppliers of cloth to the apparel company should not indulge in labor

malpractice like child labor and should adhere to safety standards within its factories. The company should procure cloth only from suppliers who adhere to such standards.

- (c) **Developing Organizational Capability:** Companies need to manage change within the organization and beyond. The company should identify “what it is capable of being great at?” in order to differentiate it from its competitors. For example, the apparel company may have the capability of tracking its inventory at the stores on real time basis. As soon as the inventory falls below a certain level, the stores issues fresh products to stock up. This ensures that there are no stock outs at the retail outlet. This ability to track inventory real time and ability to stock up quickly may be unique to the company that gives it a competitive edge. Another can be the ability to quickly change the apparel production to meet changing trends. Likewise, the company should identify and develop unique capabilities to have a competitive edge in the market.
 - (d) **Harnessing creativity and innovation:** Continuous improvement and innovation brings value to the company. The company should promote a working environment that enables and appreciates creativity and innovation. For example, new apparel designs can be promoted to test the market. If found feasible, the company can go for mass production of the same.
 - (e) **Leading with vision, inspiration, and integrity:** The tone at the top defines the rest of the company. The leaders and management of the company should have a clear vision of what the company wants to achieve, develop strategy to achieve it, work with integrity and ethics. Leaders shape the future of the organization.
 - (f) **Managing with agility:** Agility would be the capability to identify and effectively respond to opportunities and threats. For example, although the apparel company is in an expansionary phase, it should consider the threat, yet opportunity of using e-commerce as a platform to reach out to customers directly. Brick and mortar stores are becoming largely redundant due to online platforms, a threat the company should recognize and act upon.
 - (g) **Succeeding through the talent of people:** An organization is only as good as the people who work in it. There should be an atmosphere of teamwork that enable achievement of organizational and personal goals. Performance evaluation, reward and recognition programs, training and talent network are ways to cultivate talent within the organization.
 - (h) **Sustaining outstanding results:** Use of EFQM model is not a onetime exercise. Constant and periodic evaluation is required to keep up and sustain excellence.
- (iv)** The criteria of the model are comprised of 5 enablers and 4 results. Enablers covers what an organization does (its objective) and how it does it (strategy, use of resources to achieve it).
- (a) **Leadership:** A leader defines the organization’s culture. They enable the organization to achieve its goals by taking the correct decisions at the correct time. To do this they should have sufficient skill, work as per the company’s code of conduct and should be ethical in their dealings.

- (b) **Strategy:** Operations should be planned and directed as per a clearly defined strategy. The company's vision and mission statement with respect to its various stakeholders are the goals that the organization wishes to achieve. Strategy (plan) enables the company to achieve these goals.
- (c) **People:** Excellence is possible only if the people working in the company wish to achieve it. They must be motivated, recognized, and managed to enable them to work towards the company's vision and mission. The work culture should be that this opens up opportunities for personal development as well. This would cultivate a bond with the organization, which enables people working within to strive for excellence.
- (d) **Partnerships and resources:** Effective management of partnerships that the company has with other organizations is critical to success. Partners could be external vendors, suppliers, and service providers. The services of partners enable business to operate smoothly. Resources, both tangible and intangible should be managed optimally. Tangible resources can be financial (cash, bank accounts) and physical assets (machinery, building, land etc.). Intangible resources would be intellectual property rights, information technology, licenses etc. Proper management of resources enables optimal results.
- (e) **Processes, Products, and Services:** A company exists because of its processes, products, and services. They should be managed and continuously improved to create value to the stakeholders.

Results are what the organization achieves following its operations and decisions. As explained before, the stakeholders of the company are investors (business), people (employees), customers and society. In order to track performance, the company has to develop Key Performance Indicators (KPI)s for each of the stakeholder groups. Results should be tracked periodically. Changes to targets and benchmarks should be continuously made to reflect the current objectives that the company wants to achieve. Some of the results that the company can look at are:

- (a) **Customer results:** Are the customers of the company satisfied with the products and service? How does the company fare in terms of brand loyalty? Is the customer base growing to indicate increasing market share?
- (b) **People results:** Does the company have skilled and motivated employees? What is the employee turnover with reasons for the same? Does the company have proper access to hire required talent? Are the employees motivated, trained, recognized, and rewarded for their performance? What is performance measurement system, is it robust and accurate to measure performance?
- (c) **Society results:** Is the company a good corporate citizen. Are the objectives of corporate social responsibility being met? If the organization is a not for profit organization, is it meeting its objectives and goals?
- (d) **Business results:** Is a for profit organization achieving the required return on investment, profitability that the shareholders and other investor demand? Has the company been able to manage financial and other risks properly?

Enablers enable achievement of results. EFQM model documents this flow and symbiosis in a structured way. It highlights the strength and weakness of the enablers. With this information, the company can alter its operations and strategy to achieve desired results. On assessment, there is a flow from results to enablers. If the results have been achieved, enablers continue to operate status quo. If the results fall short of targets, changes have to be made to enablers to improve performance.

Therefore, it can be concluded the EFQM model encourages constant self-assessment to achieve excellence.

When a company wins an excellence award based on a business excellence model, it gains in stature within the industry. This recognition could work to its advantage financially and otherwise.



CS-6: SUPPLY CHAIN MANAGEMENT

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 managers 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.

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 to 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 any time 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-7: 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 2018 to 8% in 2019 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”? EXPLAIN.
- (ii) LIST 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. Yashihuro 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.”*

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-8: 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) LIST the likely losses arising due to breakdown of machinery due to non-maintenance.
- (ii) EXPLAIN the key features of such programme.
- (iii) COMPARE the programme identified above and TQM.
- (iv) ADVISE 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 delay 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 equipment (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 losses 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 focusses 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-9: SIX SIGMA AND COST OF QUALITY**

Absolute Singapore Pte Ltd. (ASPL) manufactures electronic components for washing machines in an assembly line. Recent market survey reports indicate erosion of its clientele. Feedback taken from customers suggest that the company's products were not of good quality. ASPL is concerned because its competitors have been able to achieve zero defect performance in terms of nil sale returns on account of quality and nil subsequent warranty cost. Therefore, the competitors enjoy huge customer loyalty.

To satisfy its customers, the company ASPL wants to improve its product quality. Consequently, it has decided to undertake Six Sigma study of its operations.

Below is the additional information given about ASPL's operations:

Yearly sales of electronic components are 25,000 units at ₹20,000 each. Of these, 1% sales are returned due to quality issues. These are scrapped and a replacement is made by the company. In addition, each product is under warranty for one year after sale. If a claim is accepted under warranty, service and replacement of parts is done free of cost. Current yearly warranty claims (these are separate from sales returns), which is also representative of the average yearly warranty claims, amount to ₹30,00,000 per annum.

Quality control check and inspection is carried out directly at the assembly line. There is no quality check done at any other point in the entire work flow. Total time spent on inspection is 2,000 hours in a year which costs the company ₹10,00,000 per annum. Inspection leads to 10% rejection i.e. 2,525 units. These units require only one cycle of rework, after which they are ready for sale. Rate of rework in the units rejected on inspection at the assembly line is 5 units in 1 hour. Cost of rework is ₹6,250 per hour.

The variable cost of electronic component is ₹12,500.

The Six Sigma team as part of its study found that rework on products was mainly due to the following reasons:

- (1) Assembly line workers, including new hires, learnt on the job as to how to assemble the input material to produce the final electronic component. This led to many errors due to lack of proper standardized training. Therefore, on account of these errors, the entire electronic component has to be assembled again.
- (2) Sub-standard quality of raw material is detected on inspection only at the assembly line. By this time, the defective material is already fitted into the final electronic component. Therefore, the entire component has to be reworked upon to replace the defective raw material input.
- (3) Machines are outdated and are not entirely suitable for the current production methodology.

Proposed solutions to tackle these issues are as follows:

- (1) Provide *training to assembly line workers* to train them on the production methodology. This training is expected to standardize work flow, thereby reducing errors. Such training programs will be held regularly to update the workers on new methodologies. These programs can also serve as employee feedback sessions about the actual working conditions at the assembly line. This two-way communication can improve and streamline the production process. Brainstorming can help detect or give heads up about potential problems in the production process. Total training hours in a year are expected to be 5,000 hours, costing ₹1,000 each hour.
- (2) Currently poor quality of raw material input is detected only on inspection at the assembly line. This results in wastage of resources in terms of material, time and capacity. In addition to the existing inspection at the assembly line, a *new functional area for quality planning and improvement* is proposed to be set up. At the time of procurement, the department will determine the appropriate quality of raw material input, ensure that suppliers supply material as per these requirements as well as suggest alternatives that can help improve product quality. By ensuring quality of raw materials at the beginning of the production process, wastage of resources is reduced, if not can be eliminated. Cost of setting up such a facility will be ₹1,50,00,000. In addition to this facility, inspection will continue at the assembly line.

This ensures complete quality check during the entire production cycle. At the same time, due to the introduction of this new functionality for quality control, the pressure on resources for inspection at the assembly line would reduce.

- (3) Current machines should be replaced entirely with *new machines*. Old machines can be sold for negligible amount as scrap. New machines would cost ₹3,60,00,000 having a life of three years.

Implementation of the above three solutions can have the following impact:

- Rework of products can be entirely eliminated.
- Sale returns will reduce from 1% to 0% due to better quality of products.
- Yearly warranty claims will reduce from ₹30,00,000 to nil per annum.
- With the introduction of the new facility, time required for inspection at the assembly line would reduce from 2,000 hours to 1,200 hours. Cost of inspection to do quality check at the assembly line would reduce from ₹10,00,000 per annum to ₹600,000 per annum.
- Due to better quality, ASPL can build better reputation with the customers which can further yield additional sales of 5,000 units per year.

Required

You are the management accountant at ASPL. As part of the Six Sigma project implementation team, you are requested to EVALUATE proposals suggested by the Six Sigma team. The team has used the DMAIC technique to assess quality improvements.

Solution

DMAIC technique analyses operational problems by assessing them in the following phases (1) Define; (2) Measure; (3) Analyze; (4) Improve and (6) Control.

- (1) *Define the problem, project goals and customer requirements*: Poor quality leading to erosion of clientele.

Customers feedback indicates that product quality requires improvement. Dis-satisfaction is reflected in the form of sale returns and warranty claims. Competitors have no sale returns on account of poor quality as well as no warranty claims on its products. Hence, in an environment where 100% quality can be achieved, **ASPL is facing quality issues**. This is the problem to be addressed. Failure to do so would result in loss of clientele, leading to a possibility of going out of business. The goal of the project is to identify what is the sigma level at which the company is operating and to suggest improvements to the production process it achieve 6 σ level of operations.

- (2) *Measure current performance:* Indicators of poor quality to find out what is the sigma level of the current operations?

Current performance focusing on quality can be determined based on the cost incurred in the following phases:

- (a) *Sale returns:* Sale returns are 1% of total sales. Gross sales are 25,000 units per annum at selling price of ₹20,000 each, therefore having a value of ₹50,00,00,000. Sales returns @1% amount to ₹50,00,000 that represent the return of 250 units per annum. The cost of poor quality on account of these sale returns is the variable cost of the product ₹ 12,500 per unit. This is an avoidable cost amounting to ₹31,25,000 per annum that is 0.63% of sales (₹31,25,000/₹ 50,00,00,000).
- (b) *Warranty claims:* Warranty is an undertaking given by the company to repair the electronic component free of cost if defect occurs within a specific period of time. Hence, when the customer files a claim that is accepted by the company, it means that there has been an issue with the quality of the product. This is a liability / cost that should ideally be kept minimum, if not nil like ASPL's competitors.

Warranty for the product is for one year from the date of sale. Warranty claims this year is ₹30,00,000, which is given to be representative of the average yearly warranty cost. Therefore, currently this cost amount to 0.60% of sales (₹30,00,000/ ₹50,00,00,000).

Summarizing sale returns and warranty claims alone represent 1.23% of current sales. Considering the current percentage of deficiency, the **company is operating between 3σ and 4σ level**. The rest of the industry is able to achieve 6 σ level of operations. At zero defective production, there are no sale returns on account of quality and no warranty claim costs. Therefore, is **tremendous scope for improvement in ASPL's operations**.

- (3) *Analyze:* What is the cause of poor quality? What is the cost of resources focused on quality?

Six sigma team studied the production process in detail. Replicating the issues detailed in the given problem:

- (a) *Problem 1:* Assembly line workers, including new hires, learnt on the job as to how to assemble the input material to produce the final electronic component. This lead to many errors due to lack of proper standardized training. Therefore, on account of these errors, the entire electronic component has to assembled again.
- (b) *Problem 2:* Sub-standard quality of raw material is detected on inspection only at the assembly line. Inspection leads to 10% rejection of units. By this time, the defective material is already fitted into the final electronic component. Therefore, to entire component has to be reworked upon to replace the defective raw material input.

(c) Problem 3: Machines are outdated and are not entirely suitable for the current production methodology.

The above factors result in rework on products, an internal failure cost, that lead to wastage of material, resources, and capacity.

Two costs incurred to focus on quality are cost of inspection and cost of rework, 2,525 units are reworked upon. Time required to rework 2,525 units per year = 2,525 units / 5 units per hour = 505 hours per year. Cost of rework is given to be ₹6,250 per hour. Therefore, total cost of rework per year = ₹31,56,250.

Inspection cost for 2,000 hours at the assembly line is given to be ₹10,00,000 per annum.

Therefore, total cost of resources currently incurred for quality = ₹41,56,250 per annum.

(4) *Improve*: Reduce errors and improve quality of the product

While cost of resources currently incurred for quality is only 0.83% of sales (₹41,56,250/₹50,00,00,000), a detailed analysis brings forth many qualitative aspects that ASPL needs to be address. If its competitors are able to achieve excellence in quality, so must ASPL, in order to remain in business. Therefore, following are the proposals that can provide solutions to the problems referred to above:

(a) Solution to Problem 1: Periodic training sessions to educate new hires and update workers in the assembly line on the latest techniques in production. Standardized and informed working will lead to lower errors and thereby improving product quality. Cost per year = 5,000 hours yearly training × ₹1,000 per hour = ₹50,00,000.

(b) Solution to Problem 2: Delay in detection of poor quality input can be resolved by streamlining the work flow. New function for quality planning and improvement, at the beginning of the process helps in early detection, without wastage of resources. Cost per year for introducing this functionality = ₹1,50,00,000.

(c) Solution to Problem 3: Replace old machines with newer ones. Machine upgrade will align the resource with the production requirements. This reduce chances of errors in the production process.

Cost of procurement: ₹3,60,00,000 has a life of 3 years. Therefore, annual depreciation is ₹1,20,00,000.

(d) Consequences of implementing these proposals, as given in the problem, can result in the following improvements:

(i) Rework of products can be entirely eliminated.

(ii) Sale returns will reduce from 1% to 0% due to better quality of products.

- (iii) Yearly Warranty claims will reduce from ₹30,00,000 to nil per annum.
- (iv) With the introduction of the new facility, time required for inspection at the assembly line would reduce from 2,000 hours to 1,200 hours. Cost of inspection at the assembly line would reduce from ₹10,00,000 per annum to ₹6,00,000 per annum.
- (v) Due to better quality, ASPL can build better reputation with the customers which can further yield additional sales of 5,000 units per year.

When the company is capable to achieve points (i), (ii) and (iii) milestones, it would have achieved 6 σ operational level. The cost of quality report summarizes the above discussion:

Cost of Quality Report

Cost of Quality Component	Before Improvements		After Improvements	
	Current Cost ₹	% of Sales	Projected Cost ₹	% of Sales
Preventive Cost				
Training (5,000 hrs. × ₹1,000 per hour)	xxx	xxx	50,00,000	0.83%
Quality Planning and Improvement	xxx	xxx	1,50,00,000	2.50%
Appraisal Cost				
Inspection Cost	10,00,000	0.20%	6,00,000	0.10%
Internal Failure Cost				
Rework	31,56,250	0.63%	xxx	0.00%
External Failure Cost				
Sale Returns	31,25,000	0.63%	xxx	0.00%
Warranty Claims	30,00,000	0.60%	xxx	0.00%
Total Cost of Quality	1,02,81,250	2.06%	2,06,00,000	3.43%
Yearly Sales	50,00,00,000		60,00,00,000	
Total Cost of Quality / Sales (%)	2.06%		3.43%	

- (e) Cost of quality is 2.06% of sales of which 1.23% alone is external failure cost. This has an impact on the customer experience and can erode customer base. By implementing the six-sigma team's proposal, this external failure cost on account of sale returns and warranty costs, can completely eliminated. Internal failure cost can also be eliminated. The increase in cost of quality proposed to be made would be a preventive cost to avoid failure of quality. The company should focus on preventing the error such that it ensures that product is of good quality when it reaches the customer at the very first instance.

This enhances the customer experience and therefore eliminating the scope for external failures like sales returns and warranty claims. Better quality can yield further sales of 5,000 units per year. Therefore, an increase in spending on quality measures is justified since it not only yields significant improvements to quality but also brings in more sales orders.

Improvement to the financial position of the firm is summarized below:

Particulars	Amount ₹
Improved Contribution Margin (Ref. note 1)	3,75,00,000
Elimination of Goods Replacement	31,25,000
Elimination of Warranty Claims	30,00,000
Elimination of Rework	31,56,250
Savings in Inspection Cost	4,00,000
Total Benefit ... (A)	4,71,81,250
Additional Costs Incurred	
Training	50,00,000
Quality Planning and Improvement	1,50,00,000
Increase in Fixed Cost (Yearly Depreciation of Upgraded Machines)	1,20,00,000
Total Additional Cost ... (B)	3,20,00,000
Net Benefit ... (A) - (B)	1,51,81,250

Note 1: Incremental Contribution:

Sales have increased by 5,000 units. Selling Price is ₹20,000 per unit while variable cost is ₹12,500 per unit. Contribution is ₹7,500 per unit.

Conclusion: Six Sigma team's proposals are focused on preventing the error from occurring. Consequently, quality improves, sale improves and thereby can yield a net benefit of ₹1,51,81,250 per year to the company.

- (5) *Control*: Maintain quality at 6σ level and keep the production facilities updated.
- (i) Training sessions with workers can serve as two-way communication platform to detect other problems that can be resolved in more timely manner. Inputs received can also be used to improve the production work flow as well.
 - (ii) New function of quality planning and improvement can help the company be better informed about the latest production methodologies.
 - (iii) Updated machines are better equipped to handled changes in the production process since they are built with the latest technology. ASPL should do a continuous assessment of the state of its machines and upgrade them when necessary.

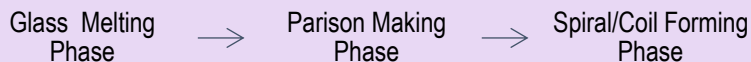


CS-10: ENVIRONMENTAL MANAGEMENT ACCOUNTING

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.

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

Required

- (i) EXPLAIN the requirement to have environmental management accounting and IDENTIFY the SBL's environmental prevention, appraisal, and failure costs.
- (ii) ANALYZE the appropriateness of SBL incorporating the following in implementing Environmental Management Accounting:
 - Activity Based Costing
 - Life Cycle Costing
 - Input Output Analysis
- (iii) EXPLAIN the need of non-financial consideration in decision making and suggest safety measures that can be taken into consideration for workers.

Solution

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

By adopting EMA, SBL will have following benefits:

- Product Pricing.
- Budgeting.
- Investment Appraisal.
- Calculating Investing Options.

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

Environmental Costs of SBL

- **Environmental Prevention Cost:** These costs are basically incurred in relation to activities undertaken to prevent the production of waste that could harm the environment.
Company's efforts to minimize the effect of its activities on the environment like installing batch house cyclonic dust collector, natural gas fired furnace, better refractory materials, training for waste minimization, research and development activities, noise absorbing device and planting trees can be classified as Environmental Preventive Cost.
- **Environmental Appraisal Costs:** It means costs incurred in relation to activities undertaken to determine whether product processes and other activities within firm are complying with environment standards.
SBL may perform 'Contamination Test' to observe the environment compatibility of its processes can be categorized under environmental appraisal cost.
- **Environmental Failure Cost:** It means cost incurred in relation to activities dealing with pollution arising from the activities of entity includes costs related to treatment harmful gases and treatment of solid waste.

Appropriateness of Techniques for Identification and Allocation

Activity Based Costing

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

Activity	Cost Drivers
<ul style="list-style-type: none"> ▪ Planting of trees 	<ul style="list-style-type: none"> ▪ Number of trees planted
<ul style="list-style-type: none"> ▪ Treatment of nitrogen oxide (<i>in the same way, activity and related cost driver for other gases would be determined</i>) 	<ul style="list-style-type: none"> ▪ Volume of nitrogen oxide treated
<ul style="list-style-type: none"> ▪ Solid waste removal 	<ul style="list-style-type: none"> ▪ Volume of such waste
<ul style="list-style-type: none"> ▪ Research and development activities 	<ul style="list-style-type: none"> ▪ Man hours worked for such activities

Life Cycle Costing

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

- In raw material stage, some natural product would be purchased.
- In manufacturing stage, emission and treatment of nitrogen oxide & other gases and treatment of solid waste.
- In marketing and distribution stage, environmental cost relating to transportation of glass bangles to various customers.

Input /Output Analysis

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

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

Non-Financial Considerations

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

In SBL, it can be clearly seen that there is great impact on health of workers. By creating 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.

**CS-11: 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 shareholder's 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 shareholder's 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-12: 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) STATE advantages and disadvantages of using financial measure as a performance measure.

- (ii) ADVISE 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.
- 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 –

- **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:

Perspective	Critical Success Factors	Key Performance Indicator
Financial	<ul style="list-style-type: none"> ▪ Be the Most Profitable Company in Motor Vehicle Industry. 	<ul style="list-style-type: none"> ▪ Profitability ratios. ▪ Revenue growth.

	<ul style="list-style-type: none"> ▪ Become the No.1 Company by in terms of Market Share in five years. 	<ul style="list-style-type: none"> ▪ Variance to budget. ▪ Number of vehicles sold.
Customer	<ul style="list-style-type: none"> ▪ Be No.1 Choice of Customers. ▪ Implement Zero Recall Policy. 	<ul style="list-style-type: none"> ▪ Number of vehicles sold vis-à-vis those sold by competitors. ▪ Number of recalls of vehicles. ▪ On time delivery of vehicles.
Internal Business	<ul style="list-style-type: none"> ▪ Total Quality Management. ▪ Zero Idle Time at Factory. 	<ul style="list-style-type: none"> ▪ Number of defective cars produced. ▪ Number of cars returned by customers as faulty. ▪ Number of hours spent in waiting by labours at assembly line.
Training and Development	<ul style="list-style-type: none"> ▪ Upto Date Technology used in Manufacturing Facilities. ▪ Skill Development for Labour and Supervisors. 	<ul style="list-style-type: none"> ▪ Amount spent in research and development year on year. ▪ Number of training hours undergone by workers and supervisor. ▪ Number of new model of vehicles launched.



CS-13: THE BUILDING BLOCK MODEL

Grab and Go is a fast food joint operating in a very competitive business environment. It is a profitable business with very good prospects for growth. A strategy development meeting is underway to chalk out a plan to improve business growth in a very systematic measurable manner.

The following information is given to you:

Grab and Go has the following mission statement *“Derive strength to grow in scale using our passion for the craft of cooking and service that will satisfy our customers, employees and other stakeholders.”* Grab and Go is a closely held partnership firm with five partners. It started at a scale of operations that catered to the local demand within a locality. Reputation for good quality food and service has help it scale up its operations in the recent years. Most of the key decisions relating to operations like decision about the menu and its method of preparation, product pricing, finance, marketing, administration etc. are centralized. Skilled chefs, managers for various functions and the firm’s partners are part of this core team.

A general survey published in a food trade magazine highlighted people’s perception about fast food diet. Predominant opinion was that the current food platter available in food joints across the town were not healthy option. People want healthier choices in the menu when they dine out. At the same time, they do not want to compromise on taste or presentation of the food item. The other focal point for improvement was the order taking system. In most food joints, the current system is manual where the order taking staff note down a customer’s order on paper, send it to

the kitchen and then delivers the order on intimation from the kitchen, which is also done manually by the kitchen staff. This system has problems like errors in taking down orders, most times delivery staff are unaware of the content in an item or its availability, delays in delivery leading to customers complaining about food served cold etc. This problem takes away the pleasure of dining out and is leaving customers dissatisfied. Another scope for improvement is that customers want more payment options other than cash to settle their bills. With the advent of plastic money and mobile e wallet payments carrying cash around has become cumbersome for most of them.

The partners have decided to use this as an opportunity to develop Grab and Go as the niche food joint addressing the customer's concerns, while managing to remain profitable. Consequently, Grab and Go plans to expand by providing more choices along with its regular menu to health-conscious customers. Also, revamping its ordering, delivery and payment system would improve customer experience. A reasonable return at the overall firm level would be a return on equity (Net Income / Total Partnership Capital) of 25% each year. Capital structure will remain unchanged. The partners are not interested in diluting their share by bringing in new partners or take external funding with ownership stake. They may however utilize bank financing for expansion, but only if required.

Expansion of business will entail opening new branches in other localities as well as forging franchise with other stakeholders. However, Grab and Go is not clear how to measure market share since the fast food industry market is not entirely an organized sector. There is no clear information about the overall revenue of the whole sector.

In the past, it was quality of its products that drove growth. The management wishes to maintain high quality standards across branches and franchisee. Therefore, an internal quality control department may be established to look into the same. External certifications from government food inspectors and other recognized agencies would also be required to be met. Quality refers to both product quality and service quality, in this case, service being an inherent part of customer experience.

The staff at Grab and Go are also excited at this opportunity. Expansion of the food joint would present a more dynamic work culture. Chefs would have the opportunity to enhance their skill by trying out various ways to cater to the consumer's palate. Ordering and delivery staff would have the opportunity to enhance their people management skills. This learning opportunity would definitely be an impetus for their career growth. With expansion chances of promotion within the organization increase. Financially, better business leads to the expectation of better pay and reward system.

Consequently, the management is intent on developing a performance management system that tracks performance across the organization. Among the different models, the Building Block Model is being considered.

Required

ADVISE the partners how the Building Block Model at Grab and Go could be implemented.

Solution

Performance management using the Building Block Model poses three questions based on which the performance measurement system is developed:

What dimensions of performance should the company measure?

Dimensions are the goals that the company wants to achieve based on its overall strategy, those goals that define its success.

How to set the standards (benchmarks) for those measures?

What are the rewards needed to motivate employees to achieve these standards?

Dimensions

Dimensions (goals) include financial and non-financial goals. Dimensions are further categorized as into results and determinants. Results are tracked as (a) financial performance and (b) competitive performance. Determinants are tracked as (a) quality, (b) flexibility, (c) innovation, and (d) resource utilization. Determinants influence results.

Results

- (a) Financial Performance: Grab and Go is a closely held partnership with 5 partners. Partners are interested in earning profits that have been benchmarked at an overall return on equity of 25% each year. This can be derived from periodic financial statements that get prepared as part of the accounting function. Partners want to retain the current capital structure. This implies that they do not have any plans to go public or have other external funding with ownership stake. They may take loans from banks for funding their expansion.

Consequently, if they want to expand, the firm has to make sufficient profits that will yield ample cash reserves. Therefore, Grab and Go's financial performance dimensions should also include profitability ratios like gross profit ratio, net profit ratio, operating margin, return of capital employed (if bank loans are taken) etc. Cash profit and changes in cash reserves may also be included as dimensions of performance. These measures should be tracked at the firm's overall level as well at the individual branch/franchisee level.

- (b) Competitive Performance: Grab and Go was to be a niche joint in a highly competitive segment. However, to measure how it compares with its peers there is a limitation in terms of availability of information due to the unorganized nature of the fast food industry. All the same, one of the measures that can be helpful are the number of branches / franchisees the firm is able to open.

Grab and Go is also likely to have a competitive edge because it is foraying into providing healthier food choices along with its regular menu. Since this is unique among its segment, it will retain a competitive edge until its peers start replicating the same. Therefore, one other measure for competitive performance could be the spread and uniqueness of Grab and Go's menu as compared to its peers. Information for this could be gathered from published / researched sources like trade magazines as well as informal sources like customer feedback / word of mouth.

Determinants

- (a) **Quality:** Quality drove past performance and it will continue to drive performance even after expansion. For product quality, the management should track if internal quality checks and external certifications are met periodically. Quality control should cover all branches and franchisees. Non-compliance may require immediate attention of the management. For service quality, periodic training programs can be initiated to educate the staff with people management skills. Therefore, Grab and Go should determine parameters that the management would be interested in ensuring that quality standards are met and how non-compliance should be reviewed.
- (b) **Innovation:** Innovation involves experimenting with the appropriate inputs which make them healthy. At the same time, the healthier option should satisfy the taste and presentation preference of customers. This requires innovative efforts from qualified and skilled chefs. This will give the competitive edge to Grab and Go. Innovation has to be constant and not a onetime exercise. Therefore, management may review the number of new variants that have been introduced in the menu, regularity of these introductions and customer feedback of the same.
- (c) **Flexibility:** Growth in scale of operations combined with a competitive business environment implies that Grab and Go should have some flexibility in its operations. This could mean ability to hire staff quickly, cater to seasonal surges in customer's demand etc.
- (d) **Resource utilization:** Better utilization of resources help business function efficiently. Revamping the order, delivery and payment system would improve the way resources (kitchen, ordering and delivery staff) operate. Lesser errors and delays would increase capacity utilization, freeing up time to cater to more customers. Consequently, pressure on resources decreases. Therefore, some indicators to be tracked can be overtime / idle time of kitchen, ordering and delivery staff, turnaround time in these functions, table occupancy rate, breakage, or wastage of material etc. Again here, the management should chart out the appropriate dimensions that will help them track resource utilization.

Standards

Standards are the benchmarks or targets related to the performance metric that is being tracked under each dimension. To be useful, standards should have the following characteristics:

- (a) **Ownership:** It is important to establish who in the organization structure is responsible for achievement which performance metric. Grab and Go has to consider this very carefully. As explained in the problem, many key management functions like decisions about the menu and its preparation are determined by a core team. Similarly, the centralized core team is handling finance and marketing. However, at the branch level, managers of various operational functions can be held accountable for performance of that specific process. For example, the chief at a particular branch can be held accountable for the quality of food prepared in that branch (Dimension: Quality). Similarly, the head of the order taking staff at a particular branch can be held accountable for the overtime that the staff at putting in at that branch (Dimension: Resource utilization).

- (b) **Achievability:** Benchmarks and targets will be useful only if they are achievable. The managers who have ownership for the achievement of performance metric have to be involved in setting benchmarks or targets. They should be clearly defined, preferably quantifiable. At the same time, they should be in line with the firm's overall strategy. If the target is set very high staff can get de-motivated. If set too low, will not raise the bar for performance. If not in line with the firm's overall strategy, there will be discord or gap between the firm's performance and what it wants to achieve.
- (c) **Equity:** Benchmarks should be equally challenging for all parts of the business. Grab and Go should customize its performance measure for each function like kitchen staff, order and delivery staff, finance staff, advertising staff etc. For example, while turnaround time to meet a customer's order would be relevant metric to the kitchen, ordering and delivery staff, popularity of the advertisement jingle for Grab and Go would be the relevant metric for the advertisement department. The rigor of the target should be uniform across departments. Otherwise the staff would view the benchmark system as being biased towards select functions within the firm.

Rewards

This relates to the reward structure within the firm that includes compensation package, bonus, rewards, awards, facilities provided to employees etc. Proper reward system is required for achievement of standards while maintaining costs at optimum levels. Grab and Go should have a well-defined HR policy for compensation, bonus, promotion, and reward. A good system should have the following characteristics:

- (a) **Motivation:** Does the reward system drive the people to achieve targets and standards? A low reward system would not induce staff to work towards the goal. Goal clarity and participation in target/benchmark setting can motivate staff to achieve standards.
While some part of compensation may be fixed, other parts can be made variable. For example, bonus of the advertising staff can be aligned to the sales generated, Chefs can be rewarded bonus based on sales as well quality measures etc. Better job prospects in a growing environment would also be a good motivator. Grab and Go's management should track various metric in this regard. Some of them could be percentage of bonus paid to the overall compensation package categorized staff cadre, attrition rate, internal promotions, cross training programs etc.
- (b) **Clarity:** The reward package should be clearly communicated to the staff. It should be understood by the staff concerned. They should be told what kind of performance will be rewarded and how their performance will be measured. Grab and Go may consider having a dedicated HR team for this purpose.
- (c) **Controllability:** Unlike the traditional understanding, rewards need not be based only on the financial element that the staff can control. There may be other non-financial elements for which rewards can be given. Both aspects however need to be controllable by the staff concerned. For example, the chef can come up with a popular menu. If the pricing of the product, managed by the central core team, is such that it results in a loss to Grab and Go, the chef may not get the much-deserved bonus. This is not a good reward system and might lead to attrition.



CS-14: 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 somethings 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 organisations 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.

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-15: TRADITIONAL ACCOUNTING FRAMEWORK VS. TBL FRAMEWORK**

Paper Solutions Ltd. (PSL) is a paper mill producing excellent quality writing and printing paper. It is located in a small town where eucalyptus, acacia and casuarina trees grow in plenty, which are required in the paper production process. It sources its raw material from pulp-wood plantations that grow the above-mentioned trees. These plantations are located in degraded agrarian land surrounding the factory site, which was previously wasteland. Their owners are subsistence farmers, who have been encouraged to grow these trees to source raw material for the paper mill. The mill's local procurement policy has thus provided a source of livelihood for this community. Moreover, almost 40% of the staff working at the mill are from the local community. Most of the mill's labour force lives in residential areas near the factory site. Catering to the mill employees' livelihood needs like food, clothing, education etc. has given the town alternate sources of income and thus has benefited the town. The plant managers at the mill have been working on various projects in order to build a sustainable business. This includes, reducing waste during the manufacturing process, imparting knowledge to local farmers at the pulp-wood plantations to improve the quality of wood through breeding and seed improvement techniques. Operations at the mill have yielded substantial profits over the last 15 years since inception.

You are the chief accounting officer of PSL taking care of all the reporting (internal and external) needs of the company. Recently, you read about the Triple Bottom Line (TBL) reporting that many other companies are following. You feel the need to introduce TBL reporting because:

The vital role played by the mill towards the development of the town. This can be highlighted in the TBL report. This will enhance the company's goodwill. At the same time, you feel the need for transparency of operations and balancing the need of various stakeholders involved. All this can be addressed by publishing the TBL report periodically.

The mill's operations are driven by the resources available in the environment. What the mill takes should be returned in equal if not in a higher measure. TBL reporting can help identify opportunities of giving back to the environment.

You have an appointment with the Chief Executive Officer to discuss this reporting framework. During a preliminary discussion, the CEO was sceptical of the need for additional reporting. *"We are here to do business, profit should be the sole parameter for measuring our success. Shareholders are our only stakeholders. Annual reports would provide sufficient information to others who are interested in our operations."*

Required

To convince the CEO, you need bring out the differences traditional accounting framework and the triple bottom line framework. Draft an e-mail on this subject that you need to send to the CEO for discussion at the meeting.

Solution**To: CEO****From: Chief Accounting Officer****Date: 22/06/20XX****Subject: Traditional Accounting Framework vs. Triple Bottom Line Framework**

Please find below comprehensive study on both frameworks in context of the PSL.

Best Regards,**Chief Accounting Officer**

-----**Attachment**-----

Difference between traditional accounting framework and triple bottom line framework.

- (i) Traditional accounting framework has a “single bottom line” that focuses on the profit that our company has made during the financial year. This is calculated by reducing costs, including the cost of capital, from revenues earned during the period, to arrive at the net profit that is available to the shareholders. This reporting framework has its focus on meeting the informational needs of mainly one category of stakeholder within the company, namely its shareholders. It satisfies the information needs of those interested in the financial aspects of business. It does not provide much insight on the social, environmental and economic implications of its operations.

Albeit, some information about its operations is available in various parts of its annual report, like the management discussion and analysis section or the chairman’s letter to shareholders. However, this is generally not sufficient to satisfy the information needs of other stakeholders, some of whom can be our company’s employees, customers, suppliers, communities living near our factory site or even the government. Transactions that do not directly impact our company are ignored. Recognition of an expense partly depends on utilization of assets. For example, costs incurred to operate machines used in the pulping process would include labor expense, repairs, depreciation, utility etc. These get captured as part of cost of goods manufactured in our financial reports. Therefore, assets and their related expense, that are owned and within the control of the company will be reported in the financial reports.

However, certain assets are neither owned nor controlled by the organization, yet it utilizes these resources in its operations. For example, the waste water from our company is discharged in the river nearby. The waste water contains solids, chemicals and metal compounds that were used during production. This pollutes the river water, which is the primary source of water for our town. This poses both an environmental and health risk to the citizens. Although we have taken sustainability initiatives to reduce this waste, we do not pay to clean up the river water. It is the government that undertakes the onerous task of cleaning up the river water and also bears the clean-up cost. This aspect of our company’s operations and the associated cost will not get captured in our financial reports. Hence, the true cost of operations of our company is greater than the costs reported in the financial reports. Moreover, the market price that we charge our customer for our paper product does not factor this cost. Consequently, both our company and our customers who use our product end up under-pricing the cost to the environment and society.

It can be concluded that under traditional financial reporting, sustainability and our company's performance are mutually exclusive. At the same time, information about sustainability is extremely important to other stakeholders like the community living next to the factory site since it affects their lifestyle, the local government that may be incurring substantial expense to nurture back the environment or environmentalists that seek to protect the habitat of other species. It might be critical for our company. Healthy environment and society are key drivers to sustain our operations. "Can we do business in a world fraught with sickness due to pollution?"

On the other hand, triple bottom line reporting framework focuses on a more broader view of the company addressing the interests of various other stakeholders. These stakeholders could be our company's employees, creditors, customers, communities near the factory site, government etc. The objective is to force ourselves to identify areas within our operations to create sustainable initiatives that would, in the long run, be beneficial to its current and future stakeholders as well as to our company itself. It focuses on the impact of the decisions and operations of our company on the society, environment, and economy. Known as 3Ps, people, planet and profit, hence the name "triple bottom line". Triple bottom line goes beyond the financial aspects of an organization's performance. This helps stakeholders make more informed assessments of the opportunities and risks that the company faces.

- (ii) Traditional accounting framework uses the reporting currency as the unit of measurement. It follows the accounting and reporting principles generally accepted in the country it operates.

Materiality under this framework, is measured in monetary terms, that could impact the decisions of a rational investor. On the other hand, there is no uniform standard or measure for the TBL framework. Measurement of an aspect, therefore its materiality, could either be financial or non-financial. Organizations could follow the metrics suggested in the Global Reporting Initiative (GRI) framework. In India, efforts are underway to align the GRI with the Business Responsibility Report (BRR) mandated by SEBI for some of the public companies. The TBL report focuses on both the positive and negative impact of the organization's performance on the society, environment and economy. TBL reporting may be (i) core reporting, report selective metrics or (ii) comprehensive reporting, a detailed report based on the GRI standards.

In summary, while financial reports provide information about the profitability of our company, TBL enhances the information available to various stakeholders who may hold different perspectives of the company's business operations. TBL will work well to supplement information in the financial statements.

Overall business strategy should be linked to the TBL reporting to work towards a sustainable future. Our company has already been working sustainability initiatives. Waste generation is being tackled by our plant managers. Metrics for this report has to come from various departments. Awareness about sustainability and its impact may open up opportunities that are currently being overlooked. Our company has been a lifeline for this town for the past 15 years. Why not use the TBL to highlight these positive aspects and garner goodwill for our company? TBL reporting need not remain another administrative task requiring just data gathering. It might vitalize our company to achieve greater heights of success.



CS-16: PERFORMANCE MEASUREMENT IN NOT FOR PROFIT SECTOR

The town of **Silver Sands** is located along the coast of the Caribbean Sea. Known for its beautiful coastline and pleasant weather, the town attracts a lot of tourists from all around the world. The town has two beaches that are maintained by the local government and can be used by the general public. In order to preserve the natural ecosystem, other beaches on the coastline are not accessible to the general public. Tourism is the main source of livelihood for its residents. Consequently, cleanliness of beaches is of paramount importance in order to sustain and develop this industry.

The local government has recently employed a contractor to clean up the beaches using beach cleaning machines. The contractor has been selected through a competitive tendering / bidding process. The contractor uses sand cleaning machines that are pulled by tractors. Sand is scooped onto a conveyor or screening belt. It is either raked through (combed using prongs) or sifted through (filtered), in order to separate the waste from the sand. The cleaned sand is left behind on the beach while the waste is removed. Majority of the litter comprises of plastic waste (bags, bottles etc.) while some portion also includes sea weed, glass, aluminum cans, paper, timber, and cardboard. A detailed log is kept by the contractor about the stretch of beach that has been cleaned, time taken for the clean-up, number of tractors used etc. This log is also checked and signed by a local government official. This record is used to process payments at the end of the month.

In addition to contracting with the vendor to clean machines, the local government has also placed bins at various locations on the beach for the public to dispose their waste. The town's municipality workers clean these bins every morning. Again, detailed logs of the man power and other resources employed is kept by the responsible department. In addition, the government has opened a mobile messaging system, whereby the public can message the government department if they find litter anywhere in the beach. Depending on whether it is from overflowing bins or buried debris in the sand, the municipality workers or the contractor will take action to clear it within 24 hours. A detailed log of these operations is also maintained. Patrons can also suggest measures for improving cleanliness on the beaches.

Due to its importance to the economy, the local government has allotted substantial budget for these operations. At the same time, it is essential to know if this is sufficient for the purpose of keeping the beaches clean. Therefore, the government wants to assess whether the town is getting "good value for money" from this expenditure. The "value for money" concept can be looked at from three perspectives: (i) economy, (ii) efficiency and (iii) effectiveness. The Internal Audit (IA) department that has been requested to undertake this study, has requested for guidelines on whether the audit should focus on economy and efficiency of the beach cleaning operations or on effectiveness of the same. Economy and efficiency audit assess whether the same level of service can be procured at lower cost or resources while effectiveness audit assess whether better service can be procured at same cost.

Depending on the outcome of the audits, if required, policy decisions like requesting for additional funding from the state government, alternate policy measures like levying penalty for littering etc. can be taken.

Required

Prepare a letter addressed to the IA department.

- (i) RECOMMEND guidelines to assess *economy and efficiency* of beach cleaning operations.
- (ii) RECOMMEND guidelines to assess *effectiveness* of beach cleaning operations.
- (iii) IDENTIFY challenges involved in assessment of *effectiveness*?
- (iv) RECOMMEND general guidelines, how the audit team may conclude the audit based on the combined outcomes of economy, efficiency, and effectiveness?

Solution

Date 30- July -2018

Dear Sirs,

Re: The economy, efficiency and effectiveness of beach cleaning activities

- (i) Economy and efficiency audit of an operation focuses on the consumption of resources and the output achieved. *Economy* assesses the financial aspects of the activity i.e. are the objectives of the activity being achieved at reasonable cost? *Efficiency* assesses the volume of input consumed to derive the desired output i.e. are the resources and funds being consumed to get maximum output?

To look at **Economy of Operations**, cleaning expenses need to be bifurcated into payments made to the contractor and the expenses of emptying waste from bins. Any further subcategories of these expenses, like labour, material, disposal van expenses etc. also need to be collated from the accounting or cost records. These then have to be compared to the budgets that were approved by the government of Silver Sands. The competitive tendering process can be reviewed to ensure that the contractor getting the order is offering the required quality of service at the lowest price. If the quality of cleaning has been achieved, by staying within budget, the operation is economical. However, if the actuals exceed the budget, the government has to compare them with cost of similar cleaning activities carried by neighbouring towns. On comparison, if Silver Sands operations are expensive compared to other towns, it indicates that not only are the operations uneconomical they may not be efficient either.

Efficiency of Operations can be determined by checking the log records maintained for beach cleaning by the contractor and municipality workers. These would have detailed of activities carried out and the resources utilized for each of them. For each of these services (beach cleaning and emptying out bins), the cost drivers can be identified and certain metrics can be developed for analysis. For example, the cost of running the tractors can be divided by the total number of tractors operated to get the cost of operations per tractor or

alternatively, by the kilometres of beach cleaned to arrive at a tractor-kilometre rate. While analysing these activities, certain operational considerations have to be given. For example, certain stretches of the beaches may take more time or resources to clean due to issues like rocks or soft sand. Therefore, if resources for operations disproportionate for certain parts of the beaches, the cost of maintaining those stretches need to be worked out. Data to get this information will depend on the extent of detailed maintained in the logs. This information has to be tracked over some period of time in order to understand trends in operations and related expenses.

The data collected from the mobile messaging system should also be investigated. How often and in what stretches of the beach are complaints frequent or maximum? Reasons for these lapses need to be taken from the contractor (for beach cleaning operation) and the concerned department (for emptying bins) in order to find out whether resources are being employed properly.

On this basis, deviations and exceptions should be investigated. The local government can then decide if there can be alternate sites along the coastline that may be more economical and efficient to operate.

- (ii) An audit about **Effectiveness of Operations** would focus how the actual cleanliness of beaches compares with the desired level as laid out in the policy initiative. To assess whether performance has been met, clear guidelines and metrics have to be defined during policy implementation.

To begin with, it should be clear as to what constitutes litter. From an operational angle, it would be difficult to clean out every bit of paper lying on the beach. However, it is possible to pick up every soft drink aluminum can. Hence, the government authorities must be clear on what constitutes litter? Which are the refuse that must be cleared within exception (example food refuse, animal droppings, glass bottles, tin cans, trash bins etc.) and tolerance level for certain other types of litter (e.g. Paper, seaweed etc.) that may get left behind even after cleaning. Quantity of waste collected would be the indicator to make the above assessment.

Certain other parameters like safety standards can also be defined. Safety problems could be cuts from sharp objects like glass, incidents of vector borne diseases in the area or health problems from polluted sea water. Assessment has to be made whether these standards have been met.

For this, the primary source of information about cleanliness would be feedback from the beach patrons. These could be in the form of complaints received directly or those through the mobile messaging system would provide data to work out the metrics. This would be an indicator of “customer satisfaction”. Other inputs could also be the suggestions given by the patrons about ways to improve cleanliness on the beach.

Observation by making surprise visits to inspect the beaches immediately after the cleaning operations would also provide sufficient evidence about the effectiveness of operations.

- (iii) **Challenges Involved** in assessment of effectiveness would be:

- (a) *Defining standards* about what constitutes litter and acceptable level of cleanliness? These are subjective guidelines, the perception of which may differ from person to person.
- (b) Beach patrons also play an important role in making this initiative effective. There has to be a conscious civic sense of duty not to litter, failing which this initiative will most likely be ineffective. Therefore, while measuring performance for effectiveness, *collection of more litter does not necessarily indicate effective operations*. More litter requires more cleaning and more resources, therefore is actually not a positive indicator of effectiveness. On the contrary, in the long run, lesser litter collected to maintain desired level of cleanliness would be a good indicator of effectiveness.
- (iv) The outcome of the audits can indicate achievement any or none of the three parameters of economy, efficiency and effectiveness of the beach cleaning operation. To form an **integrated conclusion** based on the different outcomes of individual audits, the audit team may consider the following guidelines:

- (a) Has the objective of the cleaning operation been achieved as per the guidelines in the relevant policy? i.e. have the operations been effective?
- (b) If the answer to (a) is yes, are the expenses within budget. If so, then the operations are economical and efficient. Given that the operations have been effective at the same time economy and efficiency have been achieved, the team can conclude that the cleaning operations policy has been a success.

A cost-over run can also be justified if the operations have been effective. In that case, the audit team has to conclude whether all expenses incurred are indeed justified and that the resources have been put to the best possible use. If not, can the operations be made more economical or efficient?

- (c) If the answer to (a) is no, the operation has not been effective, then is the difference from the target marginal or huge? If the operations have not been entirely effective, but only by a marginal gap say 95% success, then analysis of expenses can be made similar to the point (b) mentioned above. However, if the operations have been ineffective to a larger extent, then the cleaning drive initiative has been ineffective. The government has to look at alternate solutions of tackling the problem. These could include imposing heavy penalty for littering, requesting for more funding from the state government to employ better resources etc.

Therefore, it can be seen that achievement of one objective does not automatically lead to achievement of other objectives. A holistic approach would be needed to draw conclusions about the performance of the cleaning operations.

Should you have any further queries, please do not hesitate to ask.

Yours Faithfully

Management Accountant



CS-17: COMPETITIVE ADVANTAGE AND CONTROL SYSTEM

Wings International is a major airline operating from India. It is the biggest airline operator within the domestic airline segment and is a well-established player in the international airline segment. Except for a period of few years as outlined below, Wings International has been operating for the last 3 decades in a segment that caters primarily to the business and premium segment travellers. On its international routes and certain long distance, yet busy domestic routes, the airline offers full service on-board. The ticket price includes on board entertainment, transfer of baggage between flights, more leg room, option to upgrade from economy to business class seats, meals, and beverages etc. Baggage allowance is liberal with each flyer being allowed 2 checked in baggage and a cabin baggage. A tag line in its advertising goes “GRAB YOUR BAGS, THEY FLY FREE”. In the domestic segment, the airline operates across major metro cities and certain other tier-2 cities. International flights operate only from these major metro cities.

Indian aviation industry has been growing exponentially in the recent years due to a thriving economy. Consequently, there have been many new entrants in the domestic segment, offering low-cost fares to customers. These airlines have been offering tickets at huge discounts, thereby attracting a sizable chunk of customers away from Wings International. To counter this and maintain its market share, Wings International also followed suit. For a period of five years, tickets on various domestic routes were offered at low competitive price. At the same time, low fares can be offered only if it is profitable to do so. Therefore, certain cost management measures were undertaken. Wings International converted to a “no-frills” airline on most of the domestic routes. Now a ticket covered only the cost of the seat and 1 checked in baggage and 1 cabin baggage. Going further, baggage allowance was reduced to economize on space and fuel requirements. To avail any other facility, the flyer wanted had to purchase extra. Another measure taken was to offer last-minute deals of tickets at a heavy discount if the flight is not fully occupied. Vacant seats are “perishable”, therefore instead of letting them go empty, the flight can be filled at cheaper rates. This yield management measure based on capacity utilization was expected to increase market share and subsequently the airline’s revenue. Tickets could be booked online using the internet rather than through ticket kiosks maintained by the airline at various locations in selected cities.

In order to quickly respond to a competitor’s move, the pricing and marketing staff were given sufficient autonomy to make this price war work. Therefore, in many situations, decisions could be taken even without the prior approval of the top management. Meanwhile adding to the stiff competition, fuel prices have been soaring in the last few years. Maintenance of aircrafts, staff compensation and other overheads have also been increasing. Landing fees in major airports have increased manifold due to congestion and limited slots on account of multiple airline operators vying for limited slots.

Given this scenario, after 5 years of operations, the management at Wings International found that they were not able to generate sufficient profits on many of the domestic routes. A price discount by a competitor had to be matched with a similar price discount by Wings International and vice versa. Offering last minute deals to fill up capacity did not generate additional revenue. The volume of last minute flyers was low. It was found that most flyers booking at the last minute were anyway “price indifferent”. Had the deals not been offered, the flyer would have been willing

to pay more money anyway to use the airline. Therefore, neither did these deals generate extra customers nor extra revenue.

Wings International has always been perceived to cater the premium segment traveller, therefore participating in this price war had been contrary to its image of a premium quality airline. This left a section of the customers confused about the product offering. Therefore, the management of Wings International decided to discontinue its discount pricing strategy and exit the "low cost" airline business. The tickets are now being offered at its usual "full service" rates. This strategy is proposed to be followed for both current and prospective projects and operations.

The government has been formulating policies that are aimed at changing the landscape of the aviation sector. Airports are being built in smaller cities and towns that until date did not have one. This will improve connectivity within the country. It will increase air traffic as the public now has an alternate means to travel other than road and rail transport. Instead of flying between two small airports directly, Wings International proposes to develop a model where flyers from smaller towns are connected to one of the major metro cities which will serve as a main hub. For Wings International, the cost of operations will be lower as compared to flying point to point between the two small airports. For the passengers, better connectivity and more route options will be available. For example, a flyer from a smaller city, wanting to go to a destination abroad can now reach the nearest hub by flying with Wings. From the hub, Wings International can fly the passenger further to the desired destination abroad in its international fleet. For the flyer, this is a better alternative as compared to reaching the hub by say road transport. For Wings International, the proposition broadens its customer base. To this effect, Wings International is already scouting the market for smaller aircrafts that can be operated more economically on the hub-spoke route. Also, it is in talks with for partnership with other airlines, hotels, car rentals in order to offer attractive holiday packages to customers. Since most of the other airlines do not have the scale of operations to achieve the "hub-spoke" model or the ability to offer holiday packages, Wings International identifies this as a unique proposition that it can offer its customers. This time the proposed tag line for its advertisement would be "WINGS TO FLY ANYWHERE, ANYTIME". Also, Wings International proposed to increase the turnaround time of flights for better capacity utilization.

Ticket booking is still offered over the internet. In the past, customers like this option due to the convenience it offered. Dedicated customer service lines available 24×7 to resolve issues is proposed.

The management of Wings International wants to have a seamless implementation of this project. This could be a game changer for the company that will help it consolidate its position in the aviation industry. Therefore, a meeting has been called to discuss critical reporting that needs to be in place that ensures a successful launch.

Required

- (i) EVALUATE the strategy adopted by Wings International in becoming a "no frills" airline.
- (ii) IDENTIFY the strategy adopted by Wings International for the proposed project.

- (iii) The entire strategy of Wings International for the proposed project depends on information available about the future outlook in the industry. RECOMMEND guidelines to the management to put in place a control reporting mechanism that can enable Wings International to take preventive measures to avoid errors in its strategy.
- (iv) In its previous venture, it took 5 years for Wings International to decide to exit the “no frills” airline operations. To avoid a delay in taking such decisions, RECOMMEND guidelines to the management to put in place a control reporting mechanism that can enable Wings International to correct its errors and make changes in its operations in a more timely manner.

Solution

- (i) Wings International is a premium segment airline charging “full service” rates for its ticket. However, due to intense competition in the domestic market, it adopted a “low-cost advantage” strategy. Low-cost advantage or cost leadership was achieved through following measures:
 - (a) Becoming a “no-frills” airline, where the ticket included only the seat and 1 each of cabin and checked in baggage. All other facilities had to be purchased extra.
 - (b) Baggage allowance reduced to economize of space within the flight and save on fuel costs.
 - (c) Online ticket booking facilitated so that the number of ticket kiosks maintained by the airline were reduced.”

Cost leadership enabled it to offer “low cost” fares to the customers that was generated through (a) giving huge discounts on ticket prices and (b) yield management of ticket price based on capacity utilization of the flight. Although, due to its long-standing image as a premium airline, the transformation to a “no frills” airline could have caused confusion about the product offering in the minds of discerning traveller, who expect higher service quality. This could have eroded the customer base in this segment.

This “Low-cost advantage” strategy did not work due to the following reasons:

- (a) Price war from competitors reduced the ticket prices to levels that were unviable to Wings International.
- (b) Variable prices to fill up flight capacity worked against the airline, since it was found that these flyers, due to their immediate need, may have willing paid a higher price for the ticket than what was offered as part of the deal. These flyers were “price indifferent” which should have been used to Wings International’s advantage and not against it.
- (c) Costs of operations including fuel prices, aircraft maintenance, staff compensation, overheads such as landing fees had been rising in the recent years.

Due to the above reasons, Wings International’s venture as a low-cost airline became unviable.

- (ii) Wings International plans to foray into offering its service to flyer from smaller cities. This time it has adopted a “differentiation advantage” strategy. It is marketing in the following ways as being different from its competitors:
- (a) Offering a “full service” price where high quality facilities are provided to the traveller. Facilities offered ranging from on flight meals and entertainment, better seating options, liberal baggage allowance and transfer facility etc. differentiate Wings’ airlines from its “low cost, no frills” competitors.
 - (b) Ability to offer more connectivity to flyers as compared to other airlines using its unique “hub-spoke” model. “Wings to fly anywhere, anytime” is a catchy line to present this concept to potential customers.
 - (c) Ability to offer vacation packages due to strategic tie-ups with other airlines and hospitality providers like hotels, car rentals etc.
 - (d) Product differentiation can also be made between the road and rail transport providers. It can be based on relative facilities offered and better connectivity, if not based on relative cost of travel.
 - (e) Dedicated customer service lines providing support to customers to resolve issues.

Superior quality, customer responsiveness and innovation will enable Wings International to consolidate its position in the industry in the long run.

(iii) Management Control Report – Feed-forward Control Report

Management control is required to set performance measure to determine if the desired objectives of the company are being achieved or not. Control is required at every stage before the activity commences, while the activity is being performed and after the activity has been completed. Accordingly, control reports generated could be Feed-forward reports (prior), concurrent reports (during) and feedback reports (after).

When the management of Wings International wants to have a reporting system that enables to take preventive measures, it would need to have a “Feed-forward” control. This control will help measure the error before it actually takes places. Preventive measure can then be taken to change the operational variables to achieve the desired result. Guidelines to implement a “Feed-forward” control are as follows:

- (a) Through planning and analysis is required. In the case of Wings International, the proposal should be planned and analysed at various levels. The strategy of selection of appropriate routes, “full service” pricing, strategic partnerships, financing the proposal need to be taken at a higher level of management. Decisions relating to flight operations, procurement of supplies like fuel, marketing, human resource planning etc. can be done by the management in charge of operations.
- (b) Careful discrimination must be applied in selecting input variables. Planning and analysis should be done in an integrated fashion. There should be synergy in the thinking at an operational level and top management strategic level.

- (c) Feed forward mechanism should be kept dynamic. Wings International should keep a close watch on the government policies and its implementation in the civil aviation sector. Reporting may be done in pre-determined intervals say a monthly feedforward reporting can be decided upon. Changes to plans should be made in a timely fashion to make them relevant.
- (d) A model control system should be developed. Authority and responsibility for various functions need to be determined and clearly defined while developing this model.
- (e) Data on input variables should be collected regularly. For example, Changes in fuel prices, which form a large share of expenses, have to be tracked continuously. If the prices are expected to fluctuate widely, hedging options or long term price agreements with suppliers can be considered.
- (f) Feed-forward control requires action. At the time of implementation, the control model developed should be followed in order to establish a systematic course of operations.

(iv) Management Control Report – Feedback Control Report

These are control reports that provide feedback about the operations. It tracks the actual results with the budgeted / forecasted results. These reports in themselves do not cause a change in performance. The management has to take timely action to correct the errors and change its operations, if required.

Guideline to implement this reporting system are as follows:

- (a) Feedback report should disclose both accomplishment and responsibility. As discussed in the feed forward report, Wings International would have already put in place an organizational structure defining individual authority and responsibility. Performance should be tracked accordingly, so that individual performance can be assessed.
- (b) Feedback reports should be extracted promptly. The management has to decide the interval at which these reports need to be generated. The interval should be such, that changes required can be assessed and action can be taken in a timely manner. In the previous instance, Wings International had given autonomy to the marketing and pricing division to take decisions to meet the competitor's actions. It took five years to determine that the project was unviable. However, a timely reporting mechanism such as a feedback report should have been in place to appraise the top management about the decisions taken. This information would have enabled the top management to make an earlier assessment as to the viability of "no frills" airline.
- (c) Feedback reports should disclose trends and relationships. Trends could be customer travelling preferences, deals offered by competitors or other changes in flight operations. Relationships could be supplier relationships, customer relationships, strategic partner relationships etc. Information generated from all these areas should be collated in order to provide proper feedback to the management.
- (d) Feedback reports should disclose variations from standards. These standards could be from financial budgets or from non-financial metrics identified as key performance

indicators. For example, delay in flight operations could be a non-financial metric that can be tracked against an expected standard set in the planning stage. The information metric for actual operations should be assessed in the same manner with which the standard was set. For example, a flight delay in operations could be a delay in arrival beyond 15 mins. This same standard should be used to assess actual performance.

- (e) Feedback reports should be in a standardized format. It should be easily understood and well presented to the management. Facts should be stated without ambiguity and in a standard manner.



CS-18: BEYOND BUDGETING

Magical Stay is a hotel chain that has properties in popular tourist destinations. Each hotel is at least a 50 rooms establishment that has standard, elite and luxury size suites. Currently, the chain has 9 properties spread across World. Magical Stay has its corporate headquarters in Singapore, from where the senior management operate. Operations management executives are based out of each specific property that they cater to. Magical Stay is a public listed company, with majority of its shareholders being institutional investors like mutual funds, banks and insurance companies. Since these investors had a high stake in the company, they had representatives of the board of directors to govern strategic decisions. One of the strategic goals of the company for 2018, was to earn a profit of ₹1,500 million and keep increasing this target by 10% each year. Due to recessionary conditions, business has been volatile. Consequently, senior management is under pressure to meet the targets.

In order to have a defined plan for operations, Magical Stay prepares an annual budget for each of the properties as well as one master budget that consolidates at a company level. There is a separate financial and business analysis team that is in charge of this exercise. Key assumptions and future expected trends are discussed at with the operations management of each property. After incorporating the corporate headquarters numbers, the consolidated budget is presented to the senior management for approval. In order to have a uniform policy across locations, key metrics like room rent per day, material procurement for kitchen and rooms, employee hiring, capital investments at each property, advertising and promotional activities are handled directly by the corporate headquarters.

The management at each location is responsible to ensure smooth operations of the hotel chain by implementing these policies. The manager of each hotel property is given a target in terms of revenue to be generated, room occupancy and profit to be achieved. Therefore, the management at each location is also under pressure to perform and meet the target set by the senior management. In the past, if the target had not been met for couple of years, the senior management had closed down the hotel and exited the property. At the same time, best performers are given more liberal budgets to operate on. Hence, competition between various locations has always been fierce. There are constant negotiations for been given a “reasonable / practical target” that has to be achieved.

Monthly meetings are scheduled with the corporate office to explain variance of results from the budget. The recent monthly results have shown that 7 of the 9 properties have consistently not been able to meet the targets in the past six months. The situation is confounded because the tourism industry has been affected greatly by recessionary trends in the global economy. Therefore, the footfalls at the regular tourist places, where the hotel has properties, have reduced considerably. In some places occupancy during peak season has only been 60%. Therefore, operations are bleak and uncertain. At these meetings, the operations management argue that due to this dynamic scenario, the budgeted targets set become obscure since they are not based on the current circumstances.

The corporate office has met with the operations management at each of these properties in order to understand the situation better. Discussions have taken place about how the business can be improved. Few of the suggestions to improve performance are:

- (1) When the hotel is not fully booked, especially during off-season, give manager at each property the authority to rent out rooms at an attractive discount. These opportunities have to be encashed quickly, therefore the decision about the rate would be better handled by the personnel at the hotel. A guideline on the discount policy can be worked out with the corporate office. This will ensure that room occupancy rates increase, while earning reasonable return.
- (2) Allow for procurement of kitchen supplies locally, rather than buying it only from specified authorized vendors. Not only will this be cheaper, it also allows for moderate flexibility with the kitchen menu that can cater to customer demands based on current availability of supplies. Prior approvals can be taken by the management from the quality control department to ensure that customer satisfaction does not suffer.
- (3) A monthly reward and recognition program for employees, based on their service record for the month. Recommendations can be from fellow employees or the location manager.
- (4) Allow the location management autonomy, with a reasonable budget to cater to purchasing equipment. In order to address certain urgent requirements or repairs, quick response from the operations management is needed. The current process of getting approval from the corporate office is cumbersome since it takes a longer time. Autonomy can help address these issues quickly without much damage done to customer satisfaction. Funding can be quickly procured from banks if required.

Based on these discussions, the senior management has decided to decentralize all of the above decisions. As a pilot project, they have decided against preparing a line-wise detailed budget (sales budgets, operations cost budgets, advertising etc.) for each location. Instead the operations management will be given clear targets at each of the locations regarding the key profitability ratios, liquidity ratios and leverage ratios, as also guidelines on market share, quality and customer satisfaction. These benchmarks have been finalized based on industry research of peer group companies. However, the managers have the autonomy to achieve the expected target based on their individual business scenarios at each location. The focus is therefore not on achieving budget numbers that have been finalized. Instead management gets growth targets to achieve.

One year after implementing this decision, it was found that company was able to meet the shareholders' expectations, have a robust growth and an energetic employee morale.

Required

- (i) DISCUSS the traditional budgeting process had a negative impact on Magical Stay's operations.
- (ii) EXPLAIN the philosophy behind "growth based targets" instead of "budget based targets".

Solution

- (i) Magical Stay is operating in a business scenario that is highly competitive and dynamic. Focus of the traditional budget was driven towards achievement of the company's strategic goal, which was profit target of ₹1,500 million for the year 2018. Accordingly, the senior management followed a top-down approach to budgeting. Most important policy decisions like room rent per day, material procurement, employee hiring, capital investments at each property, advertising and promotional activities are handled directly by the corporate headquarters. Management in charge of operations at each location only implement it. In a changing business scenario, this budgeting methodology has the following shortcomings:
- (a) Budgets based on these policies *may not be flexible* enough in a fast-changing business environment. Although it is based on assumptions and expectations of the management has made about the business growth, in a dynamic scenario, it is very difficult to predict the future accurately. Therefore, targets or benchmarks set by the traditional budgets may become outdated quickly.
 - (b) These budgets were *based on business functions* like sales, advertising, operations etc. While a strategy for these functions is important, they are *based on internal benchmarks and assumptions* made by the management. However, for the company to be flexible in a changing environment, the focus should also be on external factors.
 - (c) The management aims to make a yearly profit that is 10% more than the previous year's profit. If previous year profit alone is the benchmark for growth, certain decisions may be shelved because they may decrease current year's profits below target. However, had these decisions been implemented they may have generated value in the long term and ultimately may have been better for earning profits in future years. For example, certain capital expenditures that may need to be undertaken quickly in order to improve customer satisfaction, may not be incurred at all simply because there is no budget for it.
 - (d) Operations management did not have much autonomy since *policies were controlled at the corporate headquarters*. At the same time, they were responsible for achieving the targets set out as per the budget. Responsibility without authority creates a negative working environment. Consequently, it might be difficult to retain talented personnel.

(e) In order to meet budget targets, managers may try to negotiate for lower sales targets to achieve, more budget allocations to meet costs etc. This does not foster positive business growth. *Managers are more intent in meeting targets rather than focusing on business growth.* It leads to lower sales than can otherwise be achieved and leads to protection of costs rather than working towards lowering operational costs.

It can be concluded that the traditional budgeting process was more inward looking. Focus is on achieving budget target rather than implementing strategies that can create more value to the company.

(ii) Following feedback from operations managers, the management given them targets based on growth instead those based on the budget alone. This is the philosophy of “**beyond budgeting**”. Below are features of this philosophy that has enabled Magical Stay to achieve better results:

(a) It is a more *decentralized and participative way* of operating a business. Rather than being made responsible for business decisions, which were not in their control, the employees delegated responsibility, combined with the necessary authority to execute decisions.

(b) Operations management and the personnel at each location are capable of quickly adapting to changing market scenarios. Likewise, since they interact with the customers directly, it enables them to make quicker decisions to ensure customer satisfaction or identify opportunities to generate more revenue.

(c) Targets are based on performance of peer group companies. *Benchmarks based on peer group performance* will be unbiased and reflects the current business scenario better. Due to this, customer’s needs and satisfaction automatically gets priority. It is the customers who ultimately drive business growth. Therefore, rather than having an inward-looking outlook, *focus is shifted to the external market conditions.* Due to autonomy, managers at various locations need not compete with each other for budget allocation. This channelizes the operational focus to meet challenges from outside competitors rather than having detrimental competition within the organization. At the same time, the targets for the company are also based on guidelines from the corporate office. Therefore, there is congregation of goals with the shareholders’ expectations.

(d) Employee morale is also boosted due to the *monthly reward and recognition system.* It fosters healthy competition among employees.

Since the focus is on growth, beyond budgeting can be a way of achieving better results in challenging business environment.



CS-19: CONTROL THROUGH STANDARD COSTING SYSTEM

'HAL' is a manufacturer, retailer, and installer of Cassette Type Split AC for industrial buyers. It started business in 2001 and its market segment has been low to medium level groups. Until recently, its business model has been based on selling high volumes of a standard AC, brand name 'Summer', with a very limited degree of customer choice, at low profit margins. 'HAL's current control system is focused exclusively on the efficiency of its manufacturing process and it reports monthly on the following variances: material price, material usage and manufacturing labour efficiency. 'HAL' uses standard costing for its manufacturing operations. In 2018, 'HAL' employs 20 teams, each of which is required to install one of its 'Summer' AC per day for 350 days a year. The average revenue per 'Summer' AC installed is ₹36,000. 'HAL' would like to maintain this side of its business at the current level. The 'Summer' installation teams are paid a basic wage which is supplemented by a bonus for every AC they install over the yearly target of 350. The teams make their own arrangements for each installation and some teams work seven days a week, and up to 12 hours a day, to increase their earnings. 'HAL' usually receives one minor complaint each time a 'Summer' AC is installed and a major complaint for 10% of the 'Summer' AC installations.

In 2016, 'HAL' had launched a new AC, brand name 'Summer-Cool'. This AC is aimed at high level corporates and it offers a very large degree of choice for the customer and the use of the highest standards of materials, appliances, and installation. 'HAL' would like to grow this side of its business. A 'Summer-Cool' AC retails for a minimum of ₹1,00,000 to a maximum of ₹5,00,000. The retail price includes installation. In 2017 the average revenue for each 'Summer-Cool' AC installed was ₹3,00,000. Currently, 'HAL' has 7 teams of 'Summer-Cool' AC installers and they can install up to 240 AC a year per team. These teams are paid salaries without a bonus element. 'HAL' has never received a complaint about a 'Summer-Cool' AC installation. 'HAL's business is generated from repeat orders, recommendations, and local press advertising. It employs three sales executives who earn an annual salary of ₹3,00,000 each. It offers a six-month money back guarantee and this has to be fulfilled for 1% of its installations. 'HAL' has always been in profits but was shocked to see that in its results in 2017 it only earned 0.2% net profit on its turnover.

Required

- (i) EVALUATE the appropriateness of 'HAL's current control system.
- (ii) RECOMMEND four Critical Success Factors (CSFs) which could assist 'HAL' in achieving future success.
- (iii) ADVISE 'HAL' about the changes it could implement in its standard costing and reporting system to achieve improved control.

Solution

- (i) **HAL's Control System** HAL's current control system is *'focused exclusively' on the manufacturing process* and its efficiency even though HAL is also a retailer and installer of industrial ACs. It is suitable for HAL's control system to monitor manufacturing efficiency with the help of the three variances: material usage, material price and manufacturing

labour efficiency. No reasons have been given for focusing on these three variances and *there may be other variances* which can provide useful control information that are not currently computed for example, labour rate and material yield. Although HAL uses standard costing, it is *unclear whether it calculates product costs*. A lack of product costs computation may be the reason that it was shocked about its 2017 profit margin. Standard costing could be in criticism for misdirecting management's attention. Thus, in the case of a 'Summer-Cool' AC where the highest standards of materials are used, it is pertinent that the quality of the finished product is not compromised. Therefore, it might be proper to accept an *unfavorable material price variance* to maintain the product's standards. *Variance analysis should not be done in isolation but a holistic view needs to be taken* about HAL's operations and the current control system may not lead to this. HAL is not currently controlling and monitoring aspects which are important for competitive success. *HAL's Critical Success Factors have not been identified yet*. There is *monthly reporting of variances* but in addition to this, there should also be *follow-up actions* for outcome resulting from these reports. However, a month is not inevitably the relevant reporting period for all aspects of HAL's business. If there is a production problem leading to excessive materials wastages, a month is too long time to wait before remedial action are taken. Therefore, real-time or coexistent reporting may be more relevant for manufacturing operations. A major deficiency of HAL's control systems is that they do not extend to retailing and installation activities. The 'Summer' installation teams are incentivized to complete ACs which could be good for their productivity. However, there is a high level of complaints associated with their work. As there is *no evident means of monitoring the installation team's work*, the reasons of the complaints cannot be identified.

- (ii) **Critical Success Factors (CSF)** are elements tied to the strategy of business and they represent objectives that business is trying to achieve, as a corporation, as a department or as a business unit. Critical success factors may vary over time and may include items like employee attitudes, manufacturing flexibility etc. There are a range of CSF's which could be appropriate for HAL. They include:

CSF: Installations Quality There are different quality expectations for the two ACs and there have been different levels of quality achieved, can be seen in the historic pattern of complaints. This strongly implies that the quality of installation should be tracked as a separate CSF for each AC. This CSF is important for HAL due to cost implications of rectifications and guarantee claims. It is also important to consider that because of the effect that poor quality will have on HAL's future business.

CSF: Customer Satisfaction Like quality, this CSF will need to be monitored separately for each AC. Customer satisfaction encompass the complete life of a transaction beginning with the initial enquiry about a purchase and continuing after installation for the life of the AC. Customer satisfaction will have an influence on HAL's future business which is dependent, in part, on repeat orders and recommendations. This CSF will also show the market's view of HAL's brand.

CSF: Brand Performance HAL has two distinct brands. They are directed at different market segments and have different associated attributes. 'Summer' ACs offer limited choice to the customer and retail, on average, for ₹36,000. HAL would like to maintain this

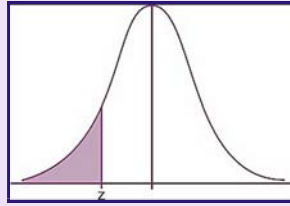
business at its present level (7,000 ACs a year minimum) ₹252 million revenue. HAL needs to ascertain where this brand is situated in its life-cycle and what marketing activities may be required to support it. The 'Summer-Cool' brand is aimed at a different market segment and HAL would like to grow this aspect of its business which produces revenue of ₹504 million. The success of both brands is important for the continual success of HAL and this CSF indicate a complete view of performance.

CSF: Manufacturing Excellence HAL manufactures all the ACs which it sells and installs. Manufacturing must be a substantial part of HAL's total costs and a significant contributor to profitability. Currently, HAL monitors some limited aspects of manufacturing through its control system. However, there are many other aspects which have not been reported upon, for example- innovation, labour absenteeism, manufacturing flexibility and investment in technology. This CSF is much broader than the current control system. It also assists in searching for competitiveness.

- (iii) **Standard Costing and Reporting System** HAL may be required to abandon or modify its standard costing and reporting system. The rationale behind this is that the current control system might lead to an inappropriate emphasis being placed on certain aspects of performance. It is noteworthy that the installations for 'Summer' AC is causing a substantial level of complaints whereas there has never been a complaint made about a 'Summer Cool' AC. It could be that the different remuneration arrangements for the ACs' installation teams have led to this and as the complaint level is an important aspect of the CSF i.e. Customer Satisfaction, HAL *may need to modify its remuneration arrangements*. It should also reckon whether it would be benefited from a broader range of variance reporting, for example, it may find reporting useful to report on labour rates and material yield. For all CSFs, HAL will need to determine the appropriate reporting intervals. Although it is useful to synchronize this with the accounting reporting cycle, CSFs and KPIs do not necessarily coexist with accounting period ends. *Some KPI's may require to be reported in real-time*, for example, material wastage, others may be of a longer duration like Customer Satisfaction. There is a strong argument for disassociation of the CSFs reporting from the financial reporting cycles.

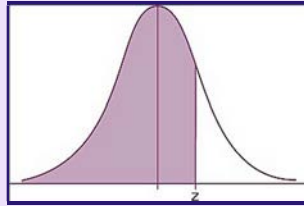


Standard Normal Cumulative Probability Table



Cumulatively Probabilities for NEGATIVE z-Values

Z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
-3.4	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0002
-3.3	0.0005	0.0005	0.0005	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0003
-3.2	0.0007	0.0007	0.0006	0.0006	0.0006	0.0006	0.0006	0.0005	0.0005	0.0005
-3.1	0.0010	0.0009	0.0009	0.0009	0.0008	0.0008	0.0008	0.0008	0.0007	0.0007
-3.0	0.0013	0.0013	0.0013	0.0012	0.0012	0.0011	0.0011	0.0011	0.0010	0.0010
-2.9	0.0019	0.0018	0.0018	0.0017	0.0016	0.0016	0.0015	0.0015	0.0014	0.0014
-2.8	0.0026	0.0025	0.0024	0.0023	0.0023	0.0022	0.0021	0.0021	0.0020	0.0019
-2.7	0.0035	0.0034	0.0033	0.0032	0.0031	0.0030	0.0029	0.0028	0.0027	0.0026
-2.6	0.0047	0.0045	0.0044	0.0043	0.0041	0.0040	0.0039	0.0038	0.0037	0.0036
-2.5	0.0062	0.0060	0.0059	0.0057	0.0055	0.0054	0.0052	0.0051	0.0049	0.0048
-2.4	0.0082	0.0080	0.0078	0.0075	0.0073	0.0071	0.0069	0.0068	0.0066	0.0064
-2.3	0.0107	0.0104	0.0102	0.0099	0.0096	0.0094	0.0091	0.0089	0.0087	0.0084
-2.2	0.0139	0.0136	0.0132	0.0129	0.0125	0.0122	0.0119	0.0116	0.0113	0.0110
-2.1	0.0179	0.0174	0.0170	0.0166	0.0162	0.0158	0.0154	0.0150	0.0146	0.0143
-2.0	0.0228	0.0222	0.0217	0.0212	0.0207	0.0202	0.0197	0.0192	0.0188	0.0183
-1.9	0.0287	0.0281	0.0274	0.0268	0.0262	0.0256	0.0250	0.0244	0.0239	0.0233
-1.8	0.0359	0.0351	0.0344	0.0336	0.0329	0.0322	0.0314	0.0307	0.0301	0.0294
-1.7	0.0446	0.0436	0.0427	0.0418	0.0409	0.0401	0.0392	0.0384	0.0375	0.0367
-1.6	0.0548	0.0537	0.0526	0.0516	0.0505	0.0495	0.0485	0.0475	0.0465	0.0455
-1.5	0.0668	0.0655	0.0643	0.0630	0.0618	0.0606	0.0594	0.0582	0.0571	0.0559
-1.4	0.0808	0.0793	0.0778	0.0764	0.0749	0.0735	0.0721	0.0708	0.0694	0.0681
-1.3	0.0968	0.0951	0.0934	0.0918	0.0901	0.0885	0.0869	0.0853	0.0838	0.0823
-1.2	0.1151	0.1131	0.1112	0.1093	0.1075	0.1056	0.1038	0.1020	0.1003	0.0985
-1.1	0.1357	0.1335	0.1314	0.1292	0.1271	0.1251	0.1230	0.1210	0.1190	0.1170
-1.0	0.1587	0.1562	0.1539	0.1515	0.1492	0.1469	0.1446	0.1423	0.1401	0.1379
-0.9	0.1841	0.1814	0.1788	0.1762	0.1736	0.1711	0.1685	0.1660	0.1635	0.1611
-0.8	0.2119	0.2090	0.2061	0.2033	0.2005	0.1977	0.1949	0.1922	0.1894	0.1867
-0.7	0.2420	0.2389	0.2358	0.2327	0.2296	0.2266	0.2236	0.2206	0.2177	0.2148
-0.6	0.2743	0.2709	0.2676	0.2643	0.2611	0.2578	0.2546	0.2514	0.2483	0.2451
-0.5	0.3085	0.3050	0.3015	0.2981	0.2946	0.2912	0.2877	0.2843	0.2810	0.2776
-0.4	0.3446	0.3409	0.3372	0.3336	0.3300	0.3264	0.3228	0.3192	0.3156	0.3121
-0.3	0.3821	0.3783	0.3745	0.3707	0.3669	0.3632	0.3594	0.3557	0.3520	0.3483
-0.2	0.4207	0.4168	0.4129	0.4090	0.4052	0.4013	0.3974	0.3936	0.3897	0.3859
-0.1	0.4602	0.4562	0.4522	0.4483	0.4443	0.4404	0.4364	0.4325	0.4286	0.4247
0.0	0.5000	0.4960	0.4920	0.4880	0.4840	0.4801	0.4761	0.4721	0.4681	0.4641



Cumulatively Probabilities for POSITIVE z-Values

Z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7517	0.7549
0.7	0.7580	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
0.8	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
1.6	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706
1.9	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9761	0.9767
2.0	0.9772	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817
2.1	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846	0.9850	0.9854	0.9857
2.2	0.9861	0.9864	0.9868	0.9871	0.9875	0.9878	0.9881	0.9884	0.9887	0.9890
2.3	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909	0.9911	0.9913	0.9916
2.4	0.9918	0.9920	0.9922	0.9925	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
2.5	0.9938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
2.6	0.9953	0.9955	0.9956	0.9957	0.9959	0.9960	0.9961	0.9962	0.9963	0.9964
2.7	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
2.8	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9979	0.9980	0.9981
2.9	0.9981	0.9982	0.9982	0.9983	0.9984	0.9984	0.9985	0.9985	0.9986	0.9986
3.0	0.9987	0.9987	0.9987	0.9988	0.9988	0.9989	0.9989	0.9989	0.9990	0.9990
3.1	0.9990	0.9991	0.9991	0.9991	0.9992	0.9992	0.9992	0.9992	0.9993	0.9993
3.2	0.9993	0.9993	0.9994	0.9994	0.9994	0.9994	0.9994	0.9995	0.9995	0.9995
3.3	0.9995	0.9995	0.9995	0.9996	0.9996	0.9996	0.9996	0.9996	0.9996	0.9997
3.4	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9998


LOGARITHMS

N	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
10	0000	0043	0086	0128	0170						5	9	13	17	21	26	30	34	38
						0212	0253	0294	0334	0374	4	8	12	16	20	24	28	32	36
11	0414	0453	0492	0531	0569						4	8	12	16	20	23	27	31	35
						0607	0645	0682	0719	0755	4	7	11	15	18	22	26	29	33
12	0792	0828	0864	0899	0934						3	7	11	14	18	21	25	28	32
						0969	1004	1038	1072	1106	3	7	10	14	17	20	24	27	31
13	1139	1173	1206	1239	1271						3	6	10	13	16	19	23	26	29
						1303	1335	1367	1399	1430	3	7	10	13	16	19	22	25	29
14	1461	1492	1523	1553	1584						3	6	9	12	15	19	22	25	28
						1614	1644	1673	1703	1732	3	6	9	12	14	17	20	23	26
15	1761	1790	1818	1847	1875						3	6	9	11	14	17	20	23	26
						1903	1931	1959	1987	2014	3	6	8	11	14	17	19	22	25
16	2041	2068	2095	2122	2148						3	6	8	11	14	16	19	22	24
						2175	2201	2227	2253	2279	3	5	8	10	13	16	18	21	23
17	2304	2330	2355	2380	2405						3	5	8	10	13	15	18	20	23
						2430	2455	2480	2504	2529	3	5	8	10	12	15	17	20	22
18	2553	2577	2601	2625	2648						2	5	7	9	12	14	17	19	21
						2672	2695	2718	2742	2765	2	4	7	9	11	14	16	18	21
19	2788	2810	2833	2856	2878						2	4	7	9	11	13	16	18	20
						2900	2923	2945	2967	2989	2	4	6	8	11	13	15	17	19
20	3010	3032	3054	3075	3096	3118	3139	3160	3181	3201	2	4	6	8	11	13	15	17	19
21	3222	3243	3263	3284	3304	3324	3345	3365	3385	3404	2	4	6	8	10	12	14	16	18
22	3424	3444	3464	3483	3502	3522	3541	3560	3579	3598	2	4	6	8	10	12	14	15	17
23	3617	3636	3655	3674	3692	3711	3729	3747	3766	3784	2	4	6	7	9	11	13	15	17
24	3802	3820	3838	3856	3874	3892	3909	3927	3945	3962	2	4	5	7	9	11	12	14	16
25	3979	3997	4014	4031	4048	4065	4082	4099	4116	4133	2	3	5	7	9	10	12	14	15
26	4150	4166	4183	4200	4216	4232	4249	4265	4281	4298	2	3	5	7	8	10	11	13	15
27	4314	4330	4346	4362	4378	393	4409	4425	440	4456	2	3	5	6	8	9	11	13	14
28	4472	4487	4502	4518	4533	4548	4564	4579	4594	4609	2	3	5	6	8	9	11	12	14
29	4624	4639	4654	4669	4683	4698	4713	4728	4742	4757	1	3	4	6	7	9	10	12	13
30	4771	4786	4800	4814	4829	4843	4857	4871	4886	4900	1	3	4	6	7	9	10	11	12
31	4914	4928	4942	4955	4969	4983	4997	5011	5024	5038	1	3	4	6	7	8	10	11	12
32	5051	5065	5079	5092	5105	5119	5132	5145	5159	5172	1	3	4	5	7	8	9	11	12
33	5185	5198	5211	5224	5237	5250	5263	5276	5289	5302	1	3	4	5	6	8	9	10	12
34	5315	5328	5340	5353	5366	5378	5391	5403	5416	5428	1	3	4	5	6	8	9	10	11
35	5441	5453	5465	5478	5490	5502	5514	5527	5539	5551	1	2	4	5	6	7	9	10	11
36	5563	5575	5587	5599	5611	5623	5635	5647	5658	5670	1	2	4	5	6	7	8	10	11
37	5682	5694	5705	5717	5729	5740	5752	5763	5775	5786	1	2	3	5	6	7	8	9	10
38	5798	5809	5821	5832	5843	5855	5866	5877	5888	5899	1	2	3	5	6	7	8	9	10
39	5911	5922	5933	5944	5955	5966	5977	5988	5999	6010	1	2	3	4	5	7	8	9	10
40	6021	6031	6042	6053	6064	6075	6085	6096	6107	6117	1	2	3	4	5	6	8	9	10
41	6128	6138	6149	6160	6170	6180	6191	6201	6212	6222	1	2	3	4	5	6	7	8	9
42	6232	6243	6253	6263	6274	6284	6294	6304	6314	6325	1	2	3	4	5	6	7	8	9
43	6335	6345	6355	6365	6375	6385	6395	6405	6415	6425	1	2	3	4	5	6	7	8	9
44	6435	6444	6454	6464	6474	6484	6493	6503	6513	6522	1	2	3	4	5	6	7	8	9

45	6532	6542	6551	6561	6471	6580	6590	6599	6609	6618	1	2	3	4	5	6	7	8	9
46	6628	6637	6646	6656	6665	6675	6684	6693	6702	6712	1	2	3	4	5	6	7	7	8
47	6721	6730	6739	6749	6758	6767	6776	6785	6794	6803	1	2	3	4	5	5	6	7	8
48	6812	6821	6830	6839	6848	6857	6866	6875	6884	6893	1	2	3	4	4	5	6	7	8
49	6902	6911	6920	6928	6937	6946	6955	6964	6972	6981	1	2	3	4	4	5	6	7	8
50	6990	6998	7007	7016	7024	7033	7042	7050	7059	7067	1	2	3	3	4	5	6	7	8
51	7076	7084	7093	7101	7110	7118	7126	7135	7143	7152	1	2	3	3	4	5	6	7	8
52	7160	7168	7177	7185	7193	7202	7210	7218	7226	7235	1	2	2	3	4	5	6	7	7
53	7243	7251	7259	7267	7275	7284	7292	7300	7308	7316	1	2	2	3	4	5	6	6	7
54	7324	7332	7340	7348	7356	7364	7372	7380	7388	7396	1	2	2	3	4	5	6	6	7
55	7404	7412	7419	7427	7435	7443	7451	7459	7466	7474	1	2	2	3	4	5	5	6	7
56	7482	7490	7497	7505	7513	7520	7528	7536	7543	7551	1	2	2	3	4	5	5	6	7
57	7559	7566	7574	7582	7589	7597	7604	7612	7619	7627	1	2	2	3	4	5	5	6	7
58	7634	7642	7649	7657	7664	7672	7679	7686	7694	7701	1	1	2	3	4	4	5	6	7
59	7709	7716	7723	7731	7738	7745	7752	7760	7767	7774	1	1	2	3	4	4	5	6	7
60	7782	7789	7796	7803	7810	7818	7825	7832	7839	7846	1	1	2	3	4	4	5	6	6
61	7853	7860	7768	7875	7882	7889	7896	7903	7910	7917	1	1	2	3	4	4	5	6	6
62	7924	7931	7938	7945	7952	7959	7966	7973	7980	7987	1	1	2	3	3	4	5	6	6
63	7993	8000	8007	8014	8021	8028	8035	8041	8048	8055	1	1	2	3	3	4	5	5	6
64	8062	8069	8075	8082	8089	8096	8102	8109	8116	8122	1	1	2	3	3	4	5	5	6
65	8129	8136	8142	8149	8156	8162	8169	8176	8182	8169	1	1	2	3	3	4	5	5	6
66	8195	8202	8209	8215	8222	8228	8235	8241	8248	8254	1	1	2	3	3	4	5	5	6
67	8261	8267	8274	8280	8287	8293	8299	8306	8312	8319	1	1	2	3	3	4	5	5	6
68	8325	8331	8338	8344	8351	8357	8363	8370	8376	8382	1	1	2	3	3	4	4	5	6
69	8388	8395	8401	8407	8414	8420	8426	8432	8439	8445	1	1	2	2	3	4	4	5	6
70	8451	8457	8463	8470	8476	8482	8488	8494	8500	8506	1	1	2	2	3	4	4	5	6
71	8513	8519	8525	8531	8537	8543	8549	8555	8561	8567	1	1	2	2	3	4	4	5	5
72	8573	8579	8585	8591	8597	8603	8609	8615	8621	8627	1	1	2	2	3	4	4	5	5
73	8633	9639	8645	8651	8657	8663	8669	8675	8681	8686	1	1	2	2	3	4	4	5	5
74	8692	8639	8704	8710	8716	8722	8727	8733	8739	8745	1	1	2	2	3	4	4	5	5
75	8751	8756	8762	8768	8774	8779	8785	8791	8797	8802	1	1	2	2	3	3	4	5	5
76	8808	8814	8820	8825	8831	8837	8842	8848	8854	8859	1	1	2	2	3	3	4	5	5
77	8865	8871	8876	8882	8887	8893	8899	8904	8910	8915	1	1	2	2	3	3	4	4	5
78	8921	8927	8932	8938	8943	8949	8954	8960	8965	8971	1	1	2	2	3	3	4	4	5
79	8976	8982	8987	8993	8998	9004	9009	9015	9020	9025	1	1	2	2	3	3	4	4	5
80	9031	9036	9042	9047	9053	9058	9063	9069	9074	9079	1	1	2	2	3	3	4	4	5
81	9085	9090	9096	9101	9106	9112	9117	9122	9128	9133	1	1	2	2	3	3	4	4	5
82	9138	9143	9149	9154	9159	9165	9170	9175	9180	9186	1	1	2	2	3	3	4	4	5
83	9191	9196	9201	9206	9212	9217	9222	9227	9232	9238	1	1	2	2	3	3	4	4	5
84	9243	9248	9253	9258	9263	9269	9274	9279	9284	9289	1	1	2	2	3	3	4	4	5
85	9294	9299	9304	9309	9315	9320	9325	9330	9335	9340	1	1	2	2	3	3	4	4	5
86	9345	9350	9355	9360	9365	9370	9375	9380	9385	9390	1	1	2	2	3	3	4	4	5
87	9395	9400	9405	9410	9415	9420	9425	9430	9435	9440	0	1	1	2	2	3	3	4	4
88	9445	9450	9455	9460	9465	9469	9474	9479	9484	9489	0	1	1	2	2	3	3	4	4
89	9494	9499	9504	9509	9513	9518	9523	9528	9533	9538	0	1	1	2	2	3	3	4	4
90	9542	9547	9552	9557	9562	9566	9571	9576	9581	9586	0	1	1	2	2	3	3	4	4
91	9590	9595	9600	9605	9609	9614	9619	9624	9628	9633	0	1	1	2	2	3	3	4	4
92	9638	9643	9647	9652	9657	9661	9666	9671	9675	9680	0	1	1	2	2	3	3	4	4
93	9685	9689	9694	9699	9703	9708	9713	9717	9722	9727	0	1	1	2	2	3	3	4	4

94	9731	9736	9741	9745	9750	9754	9759	9763	9768	9773	0	1	1	2	2	3	3	4	4
95	9777	9782	9786	9791	9795	9800	9805	9809	9814	9818	0	1	1	2	2	3	3	4	4
96	9823	9827	9832	9836	9841	9845	9850	9854	9859	9863	0	1	1	2	2	3	3	4	4
97	9868	9872	9877	9881	9886	9890	9894	9899	9903	9908	0	1	1	2	2	3	3	4	4
98	9912	9917	9921	9926	9930	9934	9939	9943	9948	9952	0	1	1	2	2	3	3	4	4
99	9956	9961	9965	9969	9974	9978	9983	9987	9997	9996	0	1	1	2	2	3	3	3	4


ANTILOGARITHMS

N	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
.00	1000	1002	1005	1007	1009	1012	1014	1016	1019	1021	0	0	1	1	1	1	2	2	2
.01	1023	1026	1028	1030	1033	1035	1038	1040	1042	1045	0	0	1	1	1	1	2	2	2
.02	1047	1050	1052	1054	1057	1059	1062	1064	1067	1069	0	0	1	1	1	1	2	2	2
.03	1072	1074	1076	1079	1081	1084	1086	1089	1091	1094	0	0	1	1	1	1	2	2	2
.04	1096	1099	1102	1104	1107	1109	1112	1114	1117	1119	0	1	1	1	1	2	2	2	2
.05	1122	1125	1127	1130	1132	1135	1138	1140	1143	1146	0	1	1	1	1	2	2	2	2
.06	1148	1151	1153	1156	1159	1161	1164	1167	1119	1172	0	1	1	1	1	2	2	2	2
.07	1175	1178	1180	1183	1186	1189	1191	1194	1197	1199	0	1	1	1	1	2	2	2	2
.08	1202	1205	1208	1211	1213	1216	1219	1222	1225	1227	0	1	1	1	1	2	2	2	3
.09	1230	1233	1236	1239	1242	1245	1247	1250	1253	1256	0	1	1	1	1	2	2	2	3
.10	1259	1262	1265	1268	1271	1274	1276	1279	1282	1285	0	1	1	1	1	2	2	2	3
.11	1288	1291	1294	1297	1300	1303	1306	1309	1312	1315	0	1	1	1	2	2	2	2	3
.12	1318	1321	1324	1327	1330	1334	1337	1340	1343	1346	0	1	1	1	2	2	2	2	3
.13	1349	1352	1355	1358	1361	1365	1368	1371	1374	1377	0	1	1	1	2	2	2	3	3
.14	1380	1384	1387	1390	1393	1396	1400	1403	1406	1409	0	1	1	1	2	2	2	3	3
.15	1413	1416	1419	1422	1426	1429	1432	1435	1439	1442	0	1	1	1	2	2	2	3	3
.16	1445	1449	1452	1455	1459	1462	1466	1469	1472	1476	0	1	1	1	2	2	2	3	3
.17	1479	1483	1486	1489	1493	1496	1500	1503	1507	1510	0	1	1	1	2	2	2	3	3
.18	1514	1517	1521	1524	1528	1531	1535	1538	1542	1545	0	1	1	1	2	2	2	3	3
.19	1549	1552	1556	1560	1563	1567	1570	1574	1578	1581	0	1	1	1	2	2	3	3	3
.20	1585	1589	1592	1596	1600	1603	1607	1611	1614	1618	0	1	1	1	2	2	3	3	3
.21	1622	1626	1629	1633	1637	1641	1644	1648	1652	1656	0	1	1	2	2	2	3	3	3
.22	1660	1663	1667	1671	1675	1679	1683	1687	1690	1694	0	1	1	2	2	2	3	3	3
.23	1698	1702	1706	1710	1714	1718	1722	1726	1730	1734	0	1	1	2	2	2	3	3	4
.24	1738	1742	1746	1750	1754	1758	1762	1766	1770	1774	0	1	1	2	2	2	3	3	4
.25	1778	1782	1786	1791	1795	1799	1803	1807	1811	1816	0	1	1	2	2	2	3	3	4
.26	1820	1824	1828	1832	1837	1841	1845	1849	1854	1858	0	1	1	2	2	3	3	3	4
.27	1862	1866	1871	1875	1879	1884	1888	1892	1897	1901	0	1	1	2	2	3	3	3	4
.28	1905	1910	1914	1919	1923	1928	1932	1936	1941	1945	0	1	1	2	2	3	3	3	4
.29	1950	1954	1959	1963	1968	1972	1977	1982	1986	1991	0	1	1	2	2	3	3	4	4
.30	1995	2000	2004	2009	2014	2018	2023	2028	2032	2037	0	1	1	2	2	3	3	4	4
.31	2042	2046	2051	2056	2061	2065	2070	2075	2080	2084	0	1	1	2	2	3	3	4	4
.32	2089	2094	2099	2104	2109	2113	2118	2123	2128	2133	0	1	1	2	2	3	3	4	4
.33	2138	2143	2148	2153	2158	2163	2168	2173	2178	2183	0	1	1	2	2	3	3	4	4
.34	2188	2193	2198	2203	2208	2213	2218	2223	2228	2234	1	1	2	2	3	3	4	4	5
.35	2239	2244	2249	2254	2259	2265	2270	2275	2280	2286	1	1	2	2	3	3	4	4	5

.36	2291	2296	2301	2307	2312	2317	2323	2328	2333	2339	1	1	2	2	3	3	4	4	5
.37	2344	2350	2355	2360	2366	2371	2377	2382	2388	2393	1	1	2	2	3	3	4	4	5
.38	2399	2404	2410	2415	2421	2427	2432	2438	2443	2449	1	1	2	2	3	3	4	4	5
.39	2455	2460	2466	2472	2477	2483	2489	2495	2500	2506	1	1	2	2	3	3	4	5	5
.40	2512	2518	2523	2529	2535	2541	2547	2553	2559	2564	1	1	2	2	3	4	4	5	5
.41	2570	2576	2582	2588	2594	2600	2606	2612	2618	2624	1	1	2	2	3	4	4	5	5
.42	2630	2636	2642	2649	2655	2661	2667	2673	2679	2685	1	1	2	2	3	4	4	5	6
.43	2692	2698	2704	2710	2716	2723	2729	2735	2742	2748	1	1	2	3	3	4	4	5	6
.44	2754	2761	2767	2773	2780	2786	2793	2799	2805	2812	1	1	2	3	3	4	4	5	6
.45	2818	2825	2831	2838	2844	2851	2858	2864	2871	2877	1	1	2	3	3	4	5	5	6
.46	2884	2891	2897	2904	2911	2917	2924	2931	2938	2944	1	1	2	3	3	4	5	5	6
.47	2951	2958	2965	2972	2979	2985	2992	2999	3006	3013	1	1	2	3	3	4	5	5	6
.48	3020	3027	3034	3041	3048	3055	3062	3069	3076	3083	1	1	2	3	3	4	5	6	6
.49	3090	3097	3105	3112	3119	3126	3133	3141	3148	3155	1	1	2	3	3	4	5	6	6
.50	3162	3170	3177	3184	3192	3199	3206	3214	3221	3228	1	1	2	3	4	4	5	6	7
.51	3236	3243	3251	3258	3266	3273	3281	3289	3296	3304	1	2	2	3	4	5	5	6	7
.52	3311	3319	3327	3334	3342	3350	3357	3365	3373	3381	1	2	2	3	4	5	5	6	7
.53	3388	3396	3404	3412	3420	3428	3436	3443	3451	3459	1	2	2	3	4	5	6	6	7
.54	3467	3475	3483	3491	3499	3508	3516	3524	3532	3540	1	2	2	3	4	5	6	6	7
.55	3548	3556	3565	3573	3581	3589	3597	3606	3614	3622	1	2	2	3	4	5	6	7	7
.56	3631	3639	3648	3656	3664	3673	3681	3690	3698	3707	1	2	3	3	4	5	6	7	8
.57	3715	3724	3733	3741	3750	3758	3767	3776	3784	3793	1	2	3	3	4	5	6	7	8
.58	3802	3811	3819	3828	3837	3846	3855	3864	3873	3882	1	2	3	4	4	5	6	7	8
.59	3890	3899	3908	3917	3926	3936	3945	3954	3963	3972	1	2	3	4	5	5	6	7	8
.60	3981	3990	3999	4009	4018	4027	4036	4046	4055	4064	1	2	3	4	5	6	6	7	8
.61	4074	4083	4093	4102	4111	4121	4130	4140	4150	4159	1	2	3	4	5	6	7	8	9
.62	4169	4178	4188	4198	4207	4217	4227	4236	4246	4256	1	2	3	4	5	6	7	8	9
.63	4266	4276	4285	4295	4305	4315	4325	4335	4345	4355	1	2	3	4	5	6	7	8	9
.64	4365	4375	4385	4395	4406	4416	4426	4436	4446	4457	1	2	3	4	5	6	7	8	9
.65	4467	4477	4487	4498	4508	4519	4529	4539	4550	4560	1	2	3	4	5	6	7	8	9
.66	4571	4581	4592	4603	4613	4624	4634	4645	4656	4667	1	2	3	4	5	6	7	9	10
.67	4677	4688	4699	4710	4721	4732	4742	4753	4764	4775	1	2	3	4	5	7	8	9	10
.68	4786	4797	4808	4819	4831	4842	4853	4864	4875	4887	1	2	3	4	6	7	8	9	10
.69	4898	4909	4920	4932	4943	4955	4966	4977	4989	5000	1	2	3	5	6	7	8	9	10
.70	5012	5023	5035	5047	5058	5070	5082	5093	5105	5117	1	2	4	5	6	7	8	9	11
.71	5129	5140	5152	5164	5176	5188	5200	5212	5224	5236	1	2	4	5	6	7	8	10	11
.72	5248	5260	5272	5284	5297	5300	5321	5333	5346	5358	1	2	4	5	6	7	9	10	11
.73	5370	5383	5395	5408	5420	5433	5445	5458	5470	5483	1	3	4	5	6	8	9	10	11
.74	5495	5508	5521	5534	5546	5559	5572	5585	5598	5610	1	3	4	5	6	8	9	10	12

.75	5623	5636	5649	5662	5675	5689	5702	5715	5728	5741	1	3	4	5	7	8	9	10	12
.76	5754	5768	5781	5794	5808	5821	5834	5848	5861	5875	1	3	4	5	7	8	9	11	12
.77	5888	5902	5916	5929	5943	5957	5970	5984	5998	6012	1	3	4	5	7	8	10	11	12
.78	6026	6039	6053	6067	6081	6095	6109	6124	6138	6152	1	3	4	6	7	8	10	11	13
.79	6166	6180	6194	6209	6223	6237	6252	6266	6281	6295	1	3	4	6	7	9	10	11	13
.80	6310	6324	6339	6353	6368	6383	6397	6412	6427	6442	1	3	4	6	7	9	10	12	13
.81	6457	6471	6486	6501	6516	6531	6546	6561	6577	6592	2	3	5	6	7	9	11	12	14
.82	6607	6622	6637	6653	6668	6683	6699	6714	6730	6745	2	3	5	6	8	9	11	12	14
.83	6761	6776	6792	6808	6823	6839	6855	6871	6887	6902	2	3	5	6	8	9	11	13	14
.84	6918	6934	6950	6966	6982	6998	7015	7031	7047	7063	2	3	5	6	8	10	11	13	15
.85	7079	7096	7112	7129	7145	7161	7178	7194	7211	7228	2	3	5	7	8	10	12	13	15
.86	7244	7261	7278	7295	7311	7328	7345	7362	7379	7396	2	3	5	7	8	10	12	13	15
.87	7413	7430	7447	7464	7482	7499	7516	7534	7551	7568	2	3	5	7	9	10	12	14	16
.88	7586	7603	7621	7638	7656	7674	7691	7709	7727	7745	2	4	5	7	9	11	12	14	16
.89	7762	7780	7798	7816	7834	7852	7870	7889	7907	7925	2	4	5	7	9	11	13	14	16
.90	7943	7962	7980	7998	8017	8035	8054	8072	8091	8110	2	4	6	7	9	11	13	15	17
.91	8128	8147	8166	8185	8204	8222	8241	8260	8279	8299	2	4	6	8	9	11	13	15	17
.92	8318	8337	8356	8375	8395	8414	8433	8453	8472	8492	2	4	6	8	10	12	13	15	17
.93	8511	8531	8551	8570	8590	8610	8630	8650	8670	8690	2	4	6	8	10	12	14	16	18
.94	8710	8730	8750	8770	8790	8810	8831	8851	8872	8892	2	4	6	8	10	12	14	16	18
.95	8913	8933	8954	8974	8995	9016	9036	9057	9078	9099	2	4	6	8	10	12	15	17	19
.96	9120	9141	9162	9183	9204	9226	9247	9268	9290	9311	2	4	6	8	11	13	15	17	19
.97	9333	9354	9376	9397	9419	9441	9462	9484	9506	9528	2	4	7	9	11	13	15	17	20
.98	9550	9572	9594	9616	9638	9661	9683	9705	9727	9750	2	4	7	9	11	13	16	18	20
.99	9772	9795	9817	9840	9863	9886	9908	9931	9954	9977	2	5	7	9	11	14	16	18	20